NATIONAL EDITION

# Food Industries

Office of the Director,
Indian Institute of Fruit Technology,
DELHI

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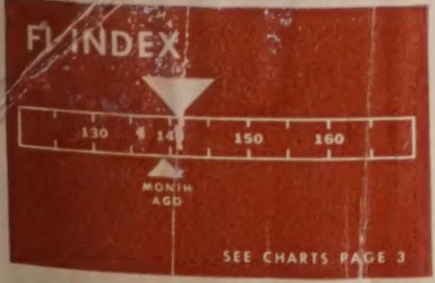
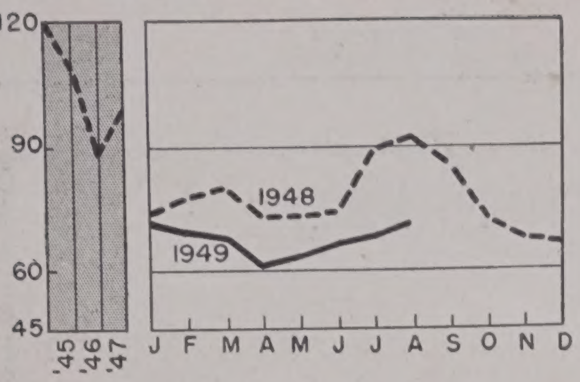
or those who control quality and costs through management
nd production—a McGraw-Hill publication

Three-lane inspection belt typifies the efficiency and close quality control at Lindsay's modern olive plant. (See p. 59)

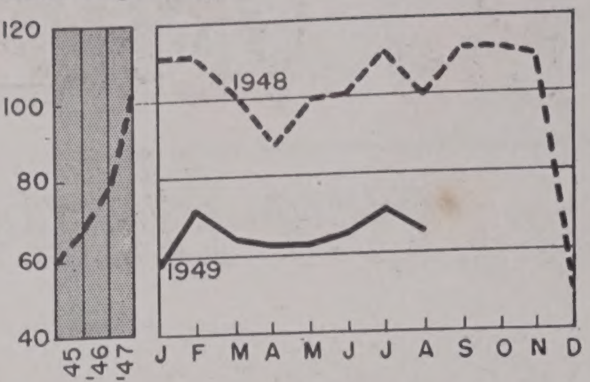


**NOVEMBER, 1949: Four cost-cutting articles, Two new departments: *Practical Ideas; Highlights,* Modern food mixing report, New wrapper test**

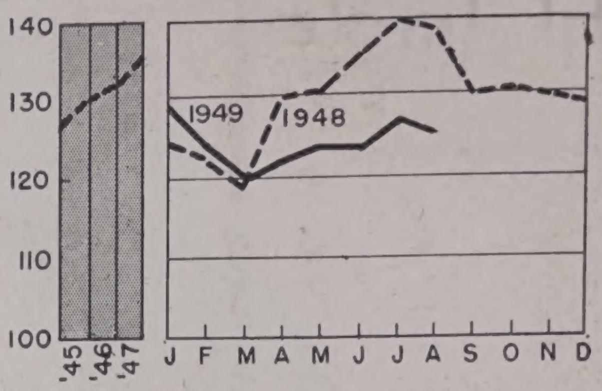
**Cane Sugar On Rise**



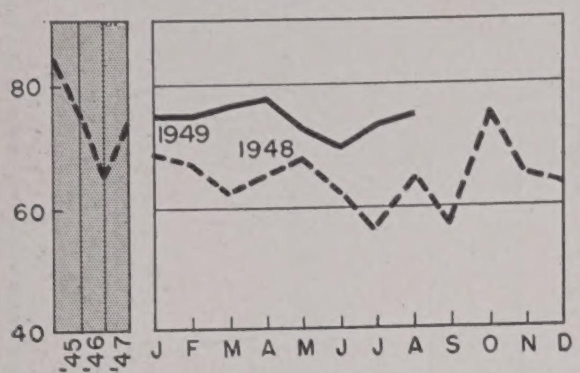
**Beet Sugar Dips**



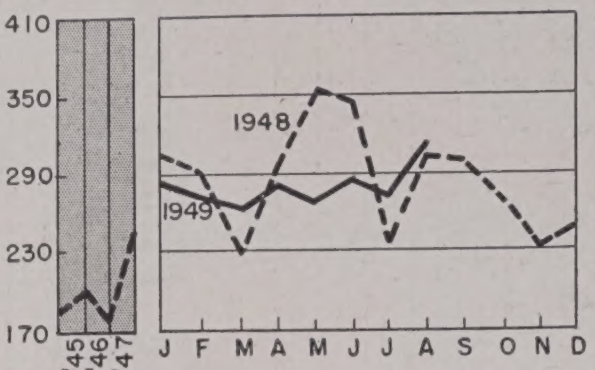
**Flour Drops Slightly**



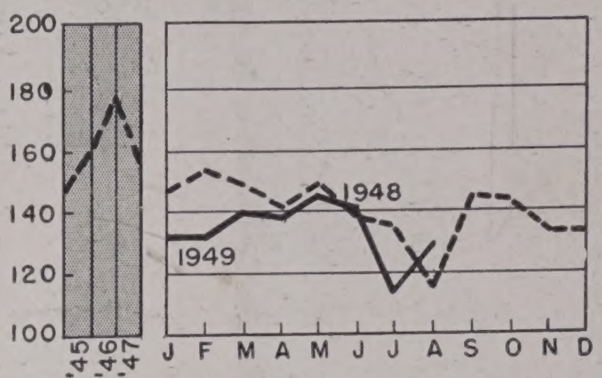
**Butter Keeps Moving**



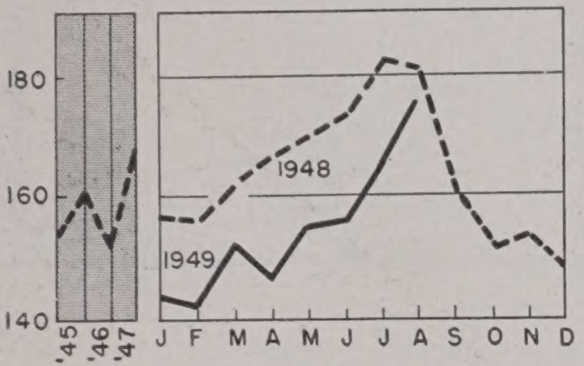
**Margarine Shoots Up**



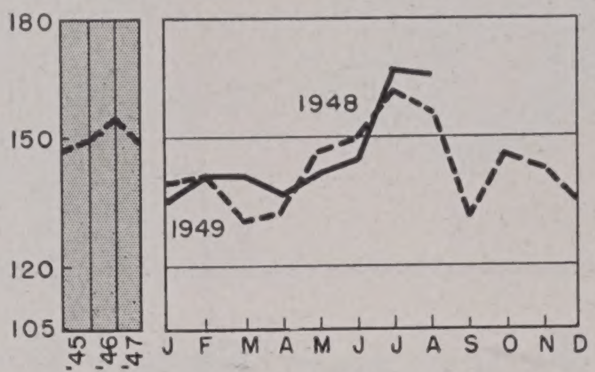
**Canning Rises**



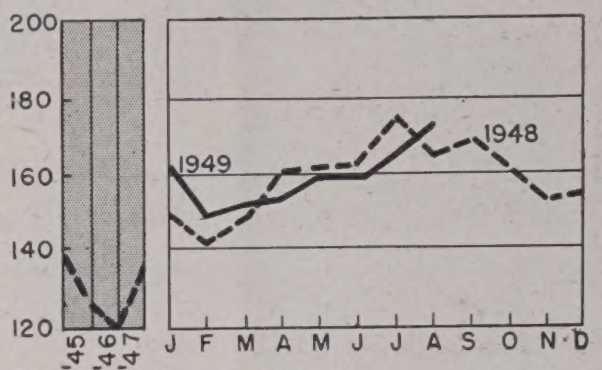
**Malt Liquors On Move**



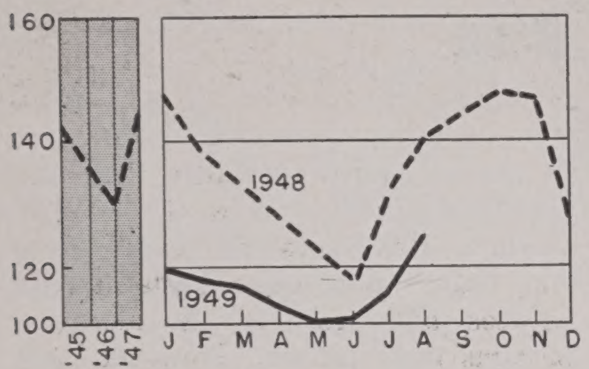
**Cereals Go Down**



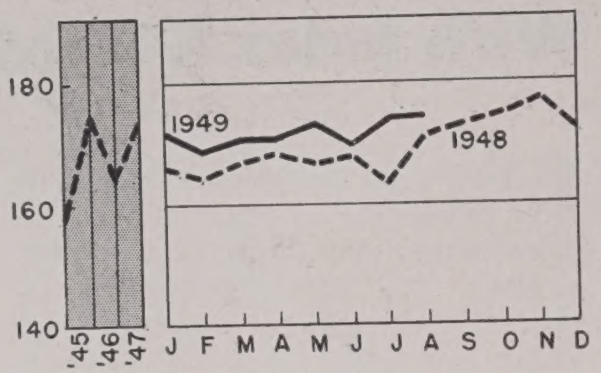
**Beverages Still Climb**



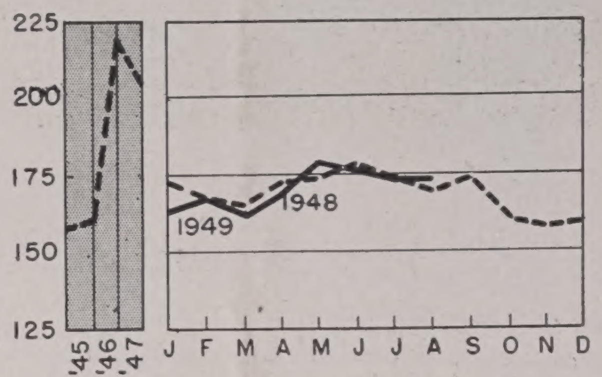
**Confectionery Climbs**



**Condensed Milk Stays Put**



**Ice Cream Holds On**



though several frozen fruit and vegetable items set new highs for stocks on hand.

Despite the autumn wave of strikes, which has boosted unemployment figures, the general trend of business and consumer income has been very strong. In fact, the fourth quarter should see a further rise in income available for spending. So domestic demand for food products will be strong.

Export demand, however, is much weaker than at this time last year. Good European harvests and a prospective reduction in foreign aid purchases make the potential market somewhat smaller. Devaluation of the British pound and other foreign currencies will not have a pronounced effect on exports, according to the latest analysis by the Department of Agriculture, because most food products are purchased in dollars under the European Recovery Program. However, food exports have felt the effect of the dollar shortage that caused the pound to be devalued.

Dairy products have felt most of the pressure. After topping 1948 in the early part of this year, dairy exports have been running below 1948 since July. Production of nonfat milk solids, a heavy export item, dropped to under 3,000,000 lb. in July. Cheese exports have also been hard hit. England has purchased no cheese in this country since July, nor is a resumption of buying in prospect. About two-thirds of U. S. exports of cheese in recent years have gone to England.

This reduction in export demand comes at a bad time for the dairy products industry, since storage demand has also weakened. Except for certain products on which government price supports eliminate the risk of inventory loss, storage demand is well below 1948. Total commercial holdings of dairy products have been running 20 percent under last year.

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# Here's the NEWEST in Sanitary Low-Head Sifters

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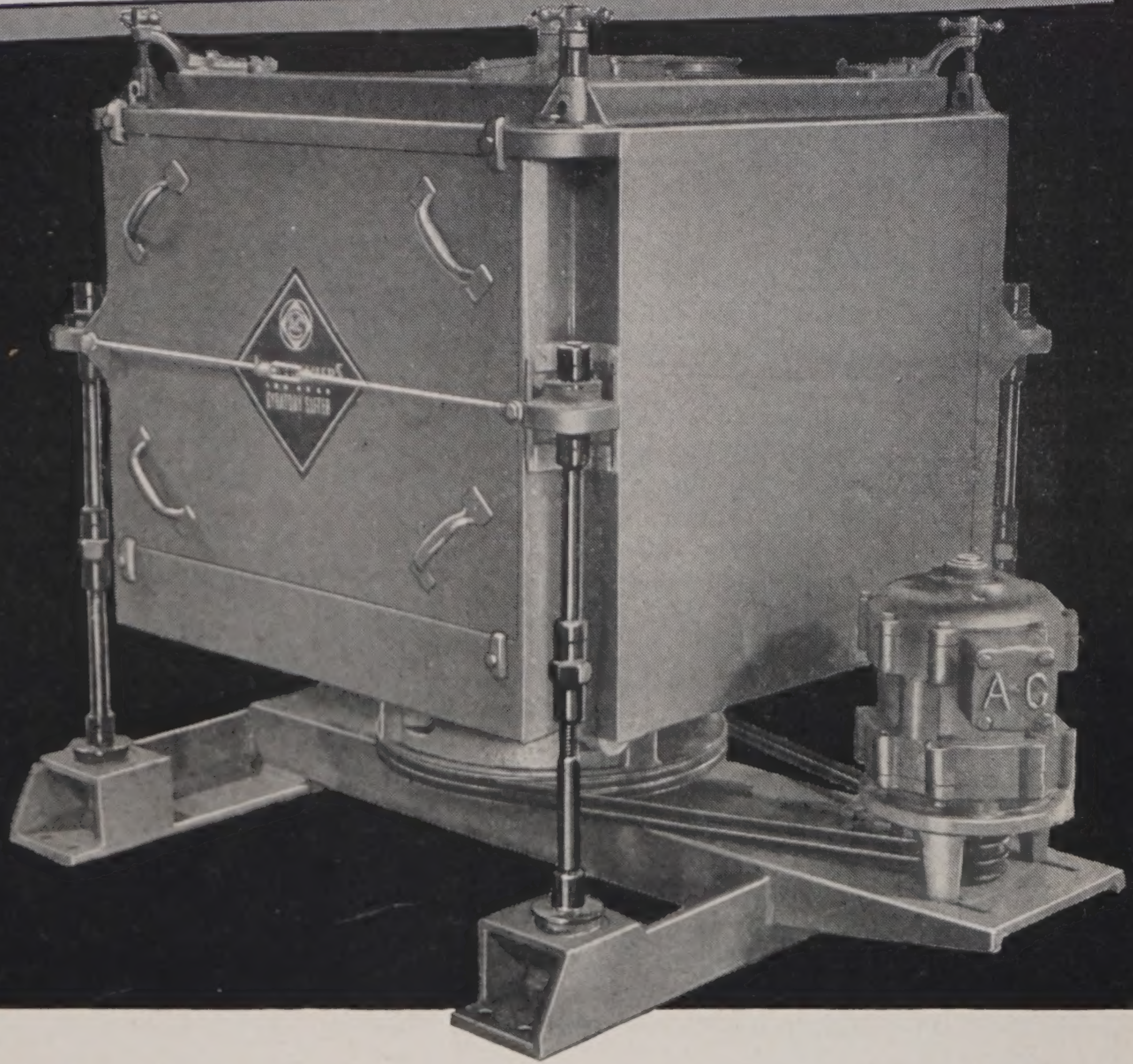

## It's a New Allis-Chalmers All-Metal Gyratory Sifter!

YES—here's a new, *sanitary* Allis-Chalmers sifter for the food processing industry. It holds the same high speed, high capacity rating as the standard Low-Head sifter—but it's all *metal* from top to bottom.

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Allis-Chalmers new all-metal gyratory sifters are available now for prompt delivery. Write for full details. Use the handy coupon.

*Low-Head is an Allis-Chalmers trademark.*

*Send coupon below for handy information packet with details on this new all-metal sifter and a copy of bulletin 06B6124A on the standard Low-Head sifter.*

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MILWAUKEE, WIS.

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☐ Would like personal visit from A-C representative with details of new sifter.

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Company ..............................

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City .............................. State ..............................

**ALLIS-CHALMERS**

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# The Talk of the Industry

### How Your Competitors Are Doing

Some food processors did better profitwise in the first half of 1949 than in the first six months of 1948—some not so well. For instance: Four dairy products manufacturers report an average rise in profits of 22 percent, five brewers had a gain of 12½ percent, six bottlers showed a plus of 5 percent, and ten bakers did a little better than hold their own.

So far so good. But six confectioners averaged a drop of nearly 17 percent in net profits, three manufacturers of grain mill products were off 5 percent, and nine processors of miscellaneous foods were down 16.4 percent.

Whichever way your figures lean, you have lots of company. But remember: Those industries showing a gain are your competitors, whether you are in their branch of the industry or not.

### Watch the Insecticide Inquiry

Initial hearings, starting on January 17, will fix tolerances for residues of poisonous or deleterious substances found on fresh fruit and fresh vegetables. But ultimately these studies are going to result also in tolerance limits for all kinds of chemicals in processed food. Close attention to this initial F&DA inquiry is important, therefore, for any food processor who uses any component or food material which might trace back to insecticide, fungicide or rodenticide contamination.

It is a tremendous subject that will necessitate an extended inquiry, taxing our patience to the limit. But it is important, too.

### Bing and Boom in Frozen OJ

How would you like to have a business whose net sales increased from less than half a million dollars in fiscal 1947 to almost three million in 1948—and nearly eight and a third million for 1949? Bing Crosby has a piece of such a business. We refer, of course to Minute Maid Corp., until recently known as Vacuum Foods. This firm and others are riding the skyrocketing boom in frozen citrus juice.

During the summer of 1947, Vacuum Foods sold 25,000 of the 6-oz. cans a week. Now sales are more than 100 times that quantity. Shows what can be done with a hot product and a Crosby radio program.

Incidentally, Bing's original stock in Vacuum Foods would net him a handsome return. They say no one knows how much money a man can make, but Bing intends to find out.

### Cutting Milk Costs at the Roots

Cheaper milk? Yes, everyone would like to see it, particularly the milk companies. And a down-to-earth approach to cost cutting is being made.

New York State dairy authorities have granted experimental permits to several farmers for the use of "loafing barns." These barns are low-cost structures—four walls and a roof—with space for cows to roam. Near by is a "parlor" with a few stanchions and milking machines, the cows being moved through it in rotation.

Expected results: Low investment in barn and equipment, lower labor costs and cheaper milk.

Effect on sanitary quality of the milk is being checked. No chances can be taken with a factor more important than price.

### Nothing Fishy About New Vitamin A

With announcement of the synthesis of vitamin A in commercial quantities by William R. Warner & Co., Inc., the problem of the food technologist in effecting food enrichment with A should be somewhat diminished. The synthetic product is free of the fish-flavor that frequently develops in natural fish liver oils.

It also spells a new problem for the cod and halibut fisheries that always derived a substantial revenue from fish livers.

Yet since beta ionone from lemon grass oil is the starting point of the new vitamin synthesis, there may be a greatly improved market for lemon grass oil. And one hazards the opinion that raising lemon grass and distilling it is a less arduous task than deep-sea fishing from a beam trawler.

### Surplus Means Stiffer Competition

During the war, Washington formed the habit of worrying about food shortages. And it is having a hard time reversing its thinking. The problem now, of course, is surpluses, yet there is no evidence of early surplus limitation. This means that foods now are encountering increased inter-commodity competition. This should be a new argument for greater palatability. The food which continues to get the business is the one which the folks like best at the dinner table.

# Hors d'Oeuvres

■ Research chemists at Monsanto say they have come up with a better tasting, plump, even-textured and less greasy doughnut. If that last keeps it from slipping during dunking operations, the work is all to the good.

■ The present oyster crop—one of the best ever—is composed mostly of oysters from the class of 1944–45, according to the Oyster Institute of North America. Wonder if they're proud to die for dear old 1944–45?

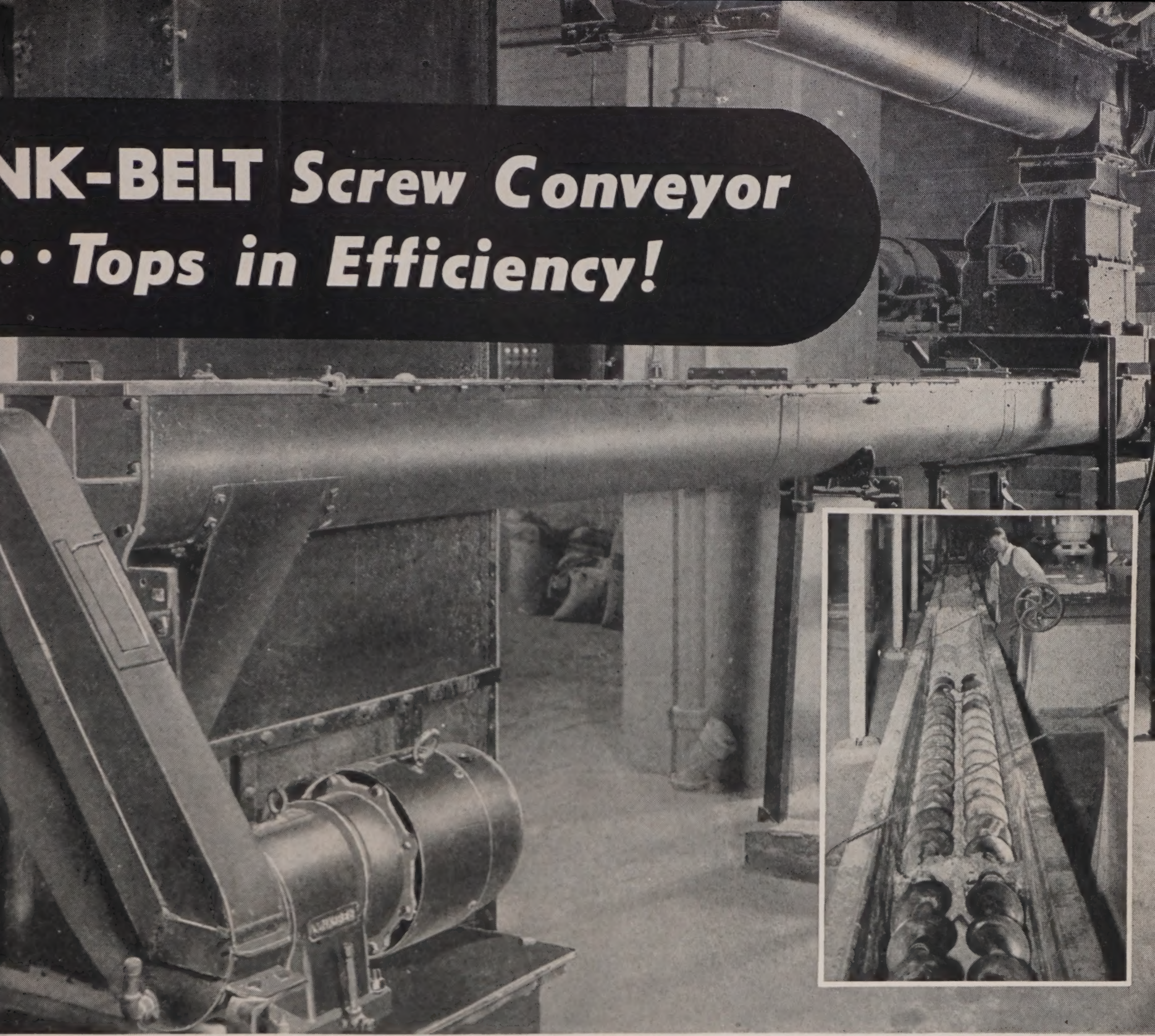
■ The candy industry recommends that its products be eaten only after and between meals. By small fry interpretation, this cuts candy eating time to about 21 hours per day.

■ Certain people are having a time in North Carolina. A new law prohibits advertising the sale of wine and beer. One brand new sign in Morehead City reads, "We Sell What It's Against the Law to Advertise."

■ Lot of stuff is being printed about the GI's as foreign chewing-gum salesmen. Exports in 1947 were 400 percent greater than during 1935-1939. Nothing like an invasion to spread culture.

■ Greek workers, says a piece of government literature, spend two-thirds of their living expenses for food. And if the farm-support boys keep bargaining for votes, the Greeks can adopt our word for it.

**J.A.J.J.**



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Bulk materials handling reduced to its simplest terms is represented by Link-Belt screw conveyor. Applicable to a wide variety of handling jobs it is the preferred method in thousands of plants in greatly diversified industries. Simple in construction, with a minimum number of moving parts, it is easy to install, economical to operate, requires negligible attention or upkeep.

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Link-Belt engineers invite your request for information or assistance in planning efficient low-cost screw conveyor installations. Contact our nearest office.

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Bucket Carriers

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unit delivered.

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"It's a *dream* of a truck . . . every way you look at it!"

That's the report . . . everywhere! And it's easy to see why the exciting, new White 3000 is the talk of the industry . . . from coast to coast!

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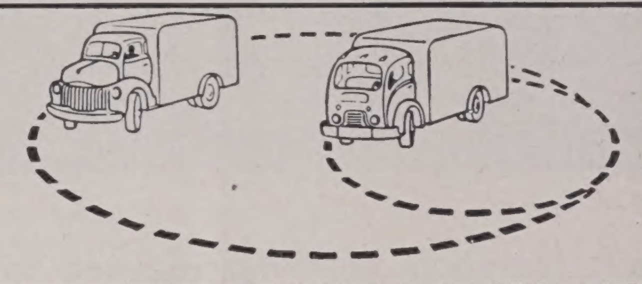
**DRIVERS LIKE IT** because it's the best-riding . . . best handling . . . best maneuvering truck on the road. Roomy cab has many driver energy-saving advantages.

**MECHANICS LIKE IT** because for the first time the front end of a truck is completely accessible in less than half a minute . . . at the turn of a key. Power-lift cab saves time, improves workmanship.

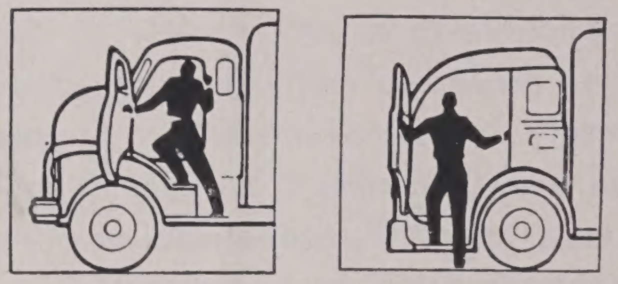
**TRAFFIC ENGINEERS LIKE IT** because of its new safety advantages . . . improved visibility . . . maneuvering features and famous Super Power engine performance.

**CUSTOMERS LIKE IT** because it's the best-dressed salesman-on-wheels you can have—a stylish design that always looks new because of its smart, functional design.

It's the same story, everywhere you go! Your local White Representative will be glad to show you how the White 3000 time- and cost-saving advantages can be applied to your business.



SHORTER TURNING RADIUS SAVES MANEUVERING TIME



BETTER CAB ACCESSIBILITY SAVES DRIVER TIME

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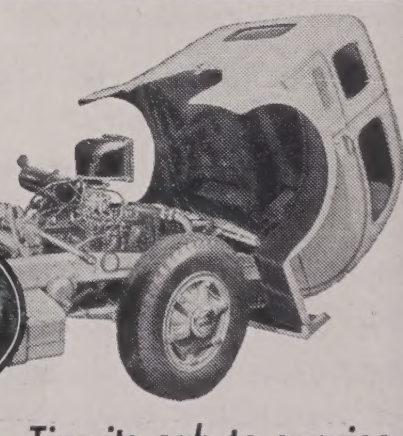

*Tips its cab to service*

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# What Washington Thinks

RESPONSIBILITIES''—Bureau of bor Statistics continues to make ailable summaries of typical and gnificant contracts between industry ms and labor unions. One of the ost important for food technologists the lately issued Bulletin 908-12, tled ''Collective Bargaining Prosions — Union and Management unctions, Rights and Responsibilies.'' This booklet enables the oprating executive to figure out just hat other folks have put in their pical contracts, 120 of which are oted in part. It is a liberal educaon to read these items before sitting own in a wage negotiation conferce.

**EAR PARITY**—This Fall, the parity atio for agricultural commodities has eached practically 100. This means at the prices received by farmers for eir produce and animals are about in e same relation to prices paid for marials, services, interest, and taxes as the base period of 1909 to 1914.

When the parity ratio drops below 00, there is increasing effort by the overnment to maintain price supports nd to encourage acreage control while olding the voters.

**MICRO TECHNIC**—Bureau of Human Nutrition & Home Economics is ndertaking to train specialists in a ew method for determining the nuritional status of an individual. Required: Only a few drops of blood aken from the fingertip. Microhemical methods used for testing permit quick and significant interpretaion as to the adequacy of the intake of nutrient by the person tested. These micro samples measure the blood for its ascorbic acid, vitamin A, protein, and hemoglobin content.

**MEAT HABITS**—''Meat Selections of City Families . . . Based on 1948 Food Consumption Surveys'' is the title of Commodity Summary No. 1, by which the home economists of the Department of Agriculture undertake to give us a picture of urban food purchasing practice. Details not readily determinable from national totals become clear in this report. One may assume that the smart meat distributor will study the results summarized in an effort to improve the market position of his firm.

**PONDEROUS**— When the bread standards hearing adjourned, Food & Drug had 17,130 pages of legal-cap record of the hearings. This was the result of a prewar proceeding, thought in those days to be lengthy, plus the operations during the last 11 months in Washington. Still to come are more briefs, due by December 20. The administrator will certainly have a total of about 20,000 pages to study and digest before he may certify any standards of even tentative form. The earliest possible effective date appears to be 1951.

**FEWER VIOLATIONS**—A year ago Department of Labor experts were very critical of corn canning plants because of the large number of violations of the Child Labor Law. Evidently, a clean-up occurred in many areas. In any event, the Department investigators this year report ''significant gains in compliance'' with the federal statutes. The major objective of the law is to prevent injury to children believed in danger if employed on certain processing operations. At least the objective is right.

**ILLEGAL BOYCOTTS**—Present labor laws forbid secondary boycotts. The objective is to prevent picketing or disturbance of *other* enterprises in an effort to enforce labor demands on an employer. Application of the law has been difficult because in some cases a primary picketing effort has the same effect as an illegal secondary boycott. NLRB has recently ruled that if the picketing is otherwise legitimate at a struck plant, it is not forbidden by the law simply because it has such incidental effect. Integrated food enterprises may find this broad decision important, even though quite difficult of interpretation.

**AIR POLLUTION**—Washington is officially concerning itself with stream pollution. Unofficially, it is watching the increasing trend toward control of air pollution also. This latter is not as yet a subject of federal statute. It does appear, however, that there will be, from time to time, advisory or technical inquiry efforts made to see how and whether there may not be better control of odor, dust, or other airborne nuisance caused to the neighbors. This gives food plant executives still one more job for self-policing.

**MUCH CONCENTRATED**—The concentration of productive facilities in 26 selected manufacturing industries has been considered in a report by Federal Trade Commission. These groups are those in which a very large percentage of the industry is found in a small number of companies, usually from four to a dozen. Of the groups studied, nine are food industries or food packaging industries. Thus, the spotlight of ''monopoly control'' again is directed at our fields of professional activity. And you will have to keep "monopoly" in quotes.

**PRICE INFLUENCE**—With its readjustment of milk orders in various urban areas, the Department of Agriculture is attempting to grant a premium payment for milk produced in ''low'' seasons, taking some of the money for the premium out of funds withheld during periods of peak delivery. Under such plan in Louisville, for example, 30c. per hundredweight for milk delivered in the spring surplus period was withheld to be used as a bonus for producers in the low supply fall period. Nobody knows whether this artificial aid for the law of supply and demand is going to be effective in smoothing out the seasonal curve of supply. Sometimes man's manipulations are over-ridden, to say it mildly.

**SQUEEZE PLAY**—All food technologists know that America wants more tin. The recent international money arrangements undertook to assure greater tin supply for the United States. At that stage, it looked as though a tin price squeeze was going to be developed. A little later, the price of tin in the U. S. dropped, while the price in Britain increased, all as a consequence of pound devaluation. Users of tin can take temporary comfort from this but should have no long-time confidence in low prices for tin.

**HIGH-SPEED CONTROL**—This year, a single airplane carrying 500 to 600 gal. of spray per trip treated, in 30 minutes, a forest area from seven to eight times as great as a full ground crew could cover in a normal season of six weeks with the best type of ground sprayers available. We wonder when mechanization of the food factory will give us any such ratio of processing speed. When it does, some of us will work a very short season, or maybe not at all. Of course someone must build and maintain the machines.

**—R. S. McBride, Washington, D. C.**

# HIGHLIGHTS

## THIS NEW PAGE HIGHLIGHTS THE MONTH'S OUTSTANDING DEVELOPMENTS

**Limits on quantities which may be discounted** are being pulled from under the Federal Trade Commission's blanket – where the authority has been slumbering since passage of the Robinson-Patman Act in 1936. This means that if FTC says a carload is your maximum, you can give no bigger discount to the multi-carload buyer. FTC approves quantity buying, but is sure bigness must be bad. (See News section)

**"Employer pay all," the current demand of unions** in respect to social benefit costs, has driven some entering wedges. Ford agreed to pay for pensions, Loft Candy Corp. agreed to pay the worker's share of taxes under New York's sickness insurance program, American Can assumed all costs of group insurance. With employers paying the entire bill, increased benefits will get plenty of support from labor.

**Two unions have agreed to joint action** in their efforts to negotiate contracts with the Big Four. They are the CIO United Packinghouse Workers and AFL's Amalgamated Meat Cutters & Butcher Workmen. It may not be good for the country, but industry-wide bargaining is thereby strengthened.

**Prepackagers of fresh meat** are finding it difficult to anticipate, and prepare for, the demands of the shopping housewives. And they are discovering that the variety of prepackaged meats offered – in respect to type, size, thickness and count – is not all the housewife would like. Basically popular, the prepackaging of meats still has a way to go before everyone will be happy with it. (See article in this issue.)

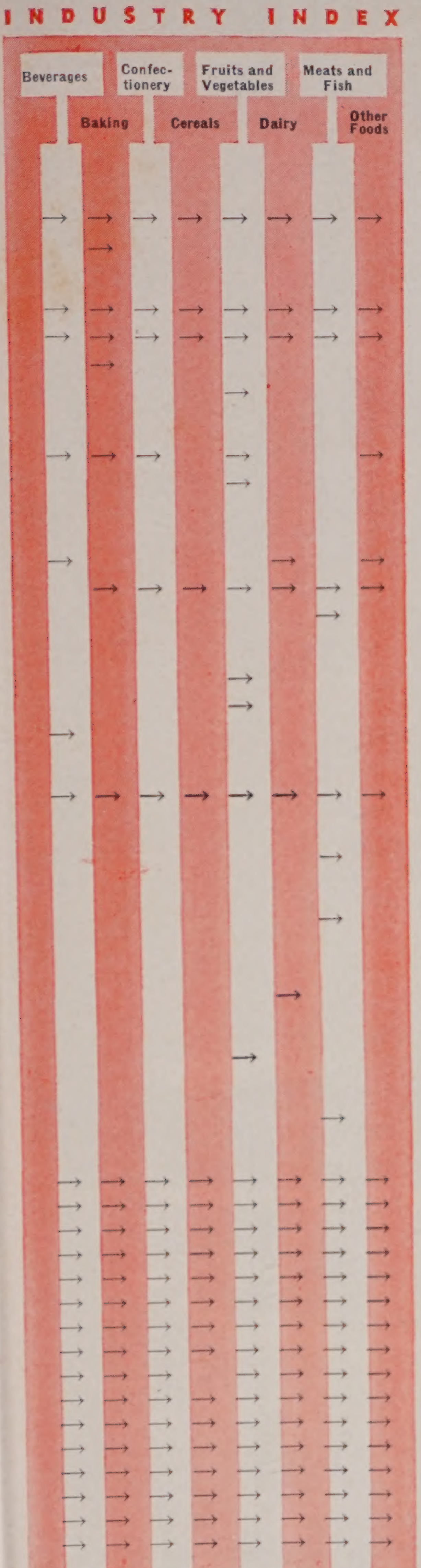
**"Trap-door" perforated cellophane** is a new solution to the problem of permitting fresh produce to "breathe" inside an eye-catching transparent-film wrapper. The tiny perforations are semi-circular die-cuts, which normally remain "closed." But they swing open like flaps to release carbon dioxide. There is no end to ingenuity in packaging. (See New Products dept.)

**Conversion of batch retorts to continuous operation** has just been announced by Berlin Chapman Co. Motor-driven rotating perforated disks move the cans through the retort, and conveyors automatically load and unload the unit. Not only is process time reduced but the labor of seven to eleven workers is eliminated from a typical canning line. Promised at the last canners' show, this development now is available.

**Supersonic processing of foods** continues to be a live subject. According to Massa Laboratories, Inc., Cleveland, butter has been produced in a few seconds by ultrasonic churning. Supersonic sterilization of foods after packaging is a possibility. So are emulsifying and separating. But don't look for commercial applications tomorrow.

**Vitamin content can be accurately measured** by growth of certain bacteria or molds, according to the New York State Agricultural Experiment Station. R. F. Brooks recently checked the niacin content of frozen peas. He measured the growth of bacteria in a culture medium, to which an increasing amount of the extract of the peas had been added, against the cloudiness of the medium. Nice short cut.

**Libby, McNeill & Libby and Phillips Packing Co.** join the frozen citrus concentrate production melee. And the "old timers" are contracting for the output of all the producers they can find. Looks like a merry race. (See News section.)



# Food Industries

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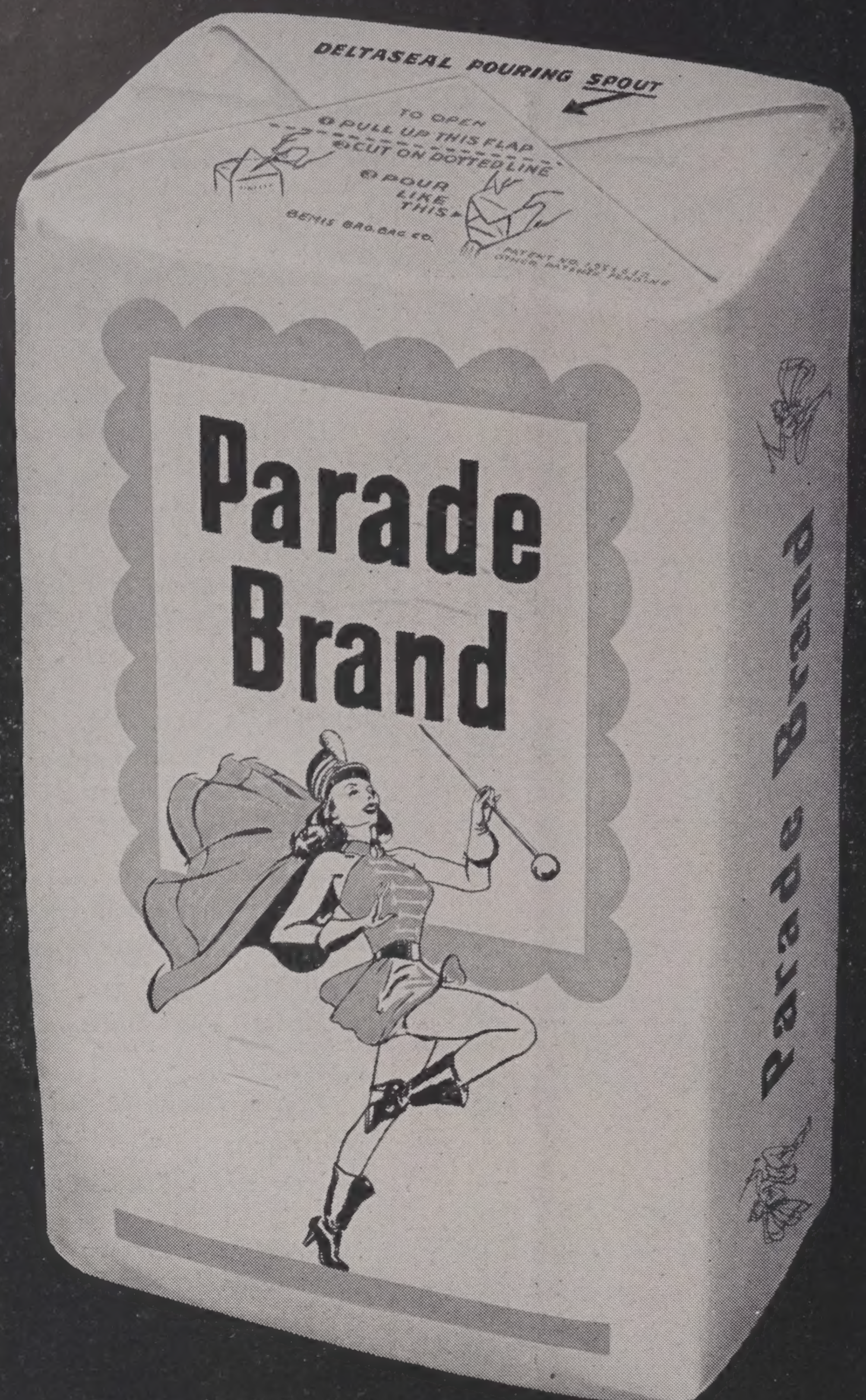
# for a greater profit margin PACKAGE FOOD the DELTASEAL way*



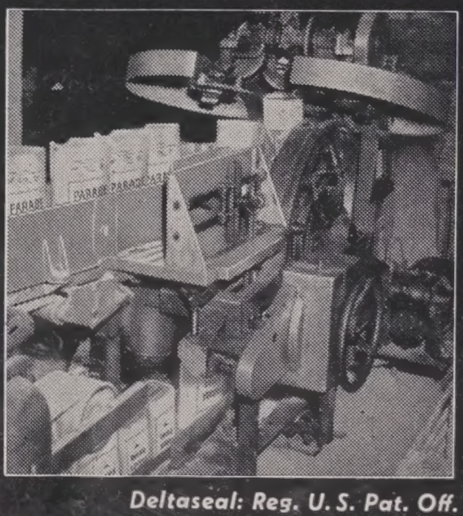
It costs less to fill bags the Deltaseal way because filling and closing is faster . . . mostly automatic. There's less handling . . . more bags closed per hour.

And Deltaseal bags are easy to open. Customers just *pull, cut and pour.* The handy spout channels the food right into the measuring cup or storage container.

The Deltaseal closure gives a neat full-pack appearance and makes it easy to build attention-getting displays in stores. Your brand, printed in bright, sparkling colors adds still further to the sales-inviting appearance of the package.

Ask a Bemis representative about the economy of Deltaseal Bags and the Deltaseal Packaging System.

*** DELTASEAL BAGS plus the DELTASEAL PACKAGING SYSTEM**



*Deltaseal: Reg. U. S. Pat. Off.*

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# Old-Fashioned "Bean Pot" Flavor

## *Thanks to Stainless Steel*

**Stainless Steel** baking pots preserve the traditional flavor of baked beans during processing in gas-fired brick ovens.

EARTHENWARE POTS and brick-lined ovens are traditional means of bringing out the spicy, appetizing flavor of baked beans. But in modern, large-scale processing, packers have found they can capture and even enhance this home-cooked taste by using Stainless Steel baking pots.

For equipment like this, Stainless Steel is the ideal material. It is unharmed by the long period of steady heat that baking involves. Stainless equipment will never affect the flavor, appearance, color or keeping qualities of food products processed in it. And it has exceptionally high resistance to the corrosive effects of liquids, spices, heat and the like.

From the standpoint of maintenance, too, Stainless is far out in front. Its high strength and toughness assure long life and a freedom from repairs that helps to make continuous processing really continuous. And don't forget the savings of time and labor that Stainless Steel's ease of cleaning makes possible.

For every type of processing equipment, investigate the wide possibilities of Stainless Steel. And if you want the finest in performance from this smooth, lustrous metal, specify U·S·S Stainless Steel. Expert metallurgical control and modern production methods give U·S·S Stainless a uniformity in finish and fabricating quality that's unsurpassed, and that is reflected in the superior services it assures.

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SHEETS · STRIP · PLATES · BARS · BILLETS · PIPE · TUBES · WIRE · SPECIAL SECTIONS

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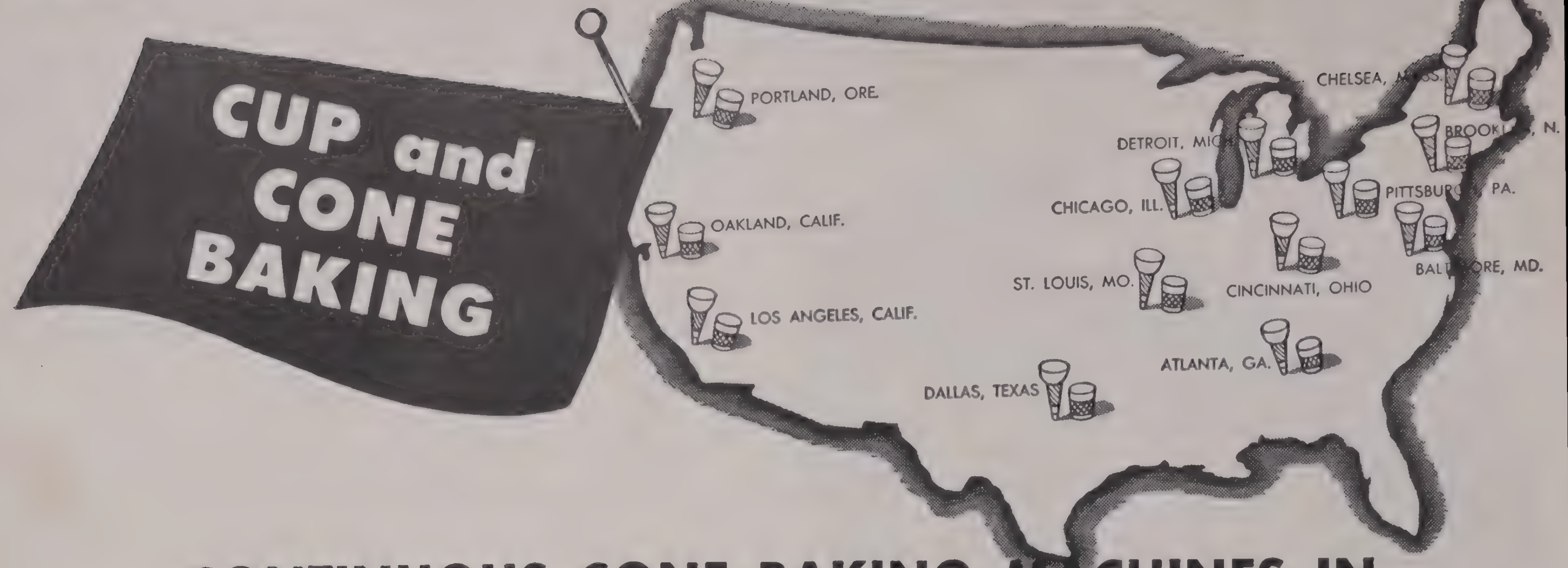
UNITED STATES STEEL



## CONTINUOUS CONE-BAKING MACHINES IN
# THIRTEEN BAKERIES, COAST-TO-COAST
## Demonstrate Controllability of *GAS*

UNIFORM TEMPERATURE of the baking molds is an essential feature of the continuous cup and cone machine. Fed automatically, one of these machines will release 5,000 cones or cups per hour when the molds are maintained at even temperatures up to 600°.

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One bakery, Keystone Cone Company of Pittsburgh, has a capacity of 225 million cones and cups per year. In describing these volume operations, General Manager J. E. Abbey emphasized the fact that GAS, in addition to its accurate controllability, was important in heat processing of foods because of its cleanliness, speed, and economy.

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Typical view of cone bakery with close-up of one of the continuous machines in which GAS maintains the baking molds at even temperatures up to 600°.

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3

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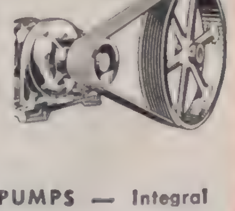

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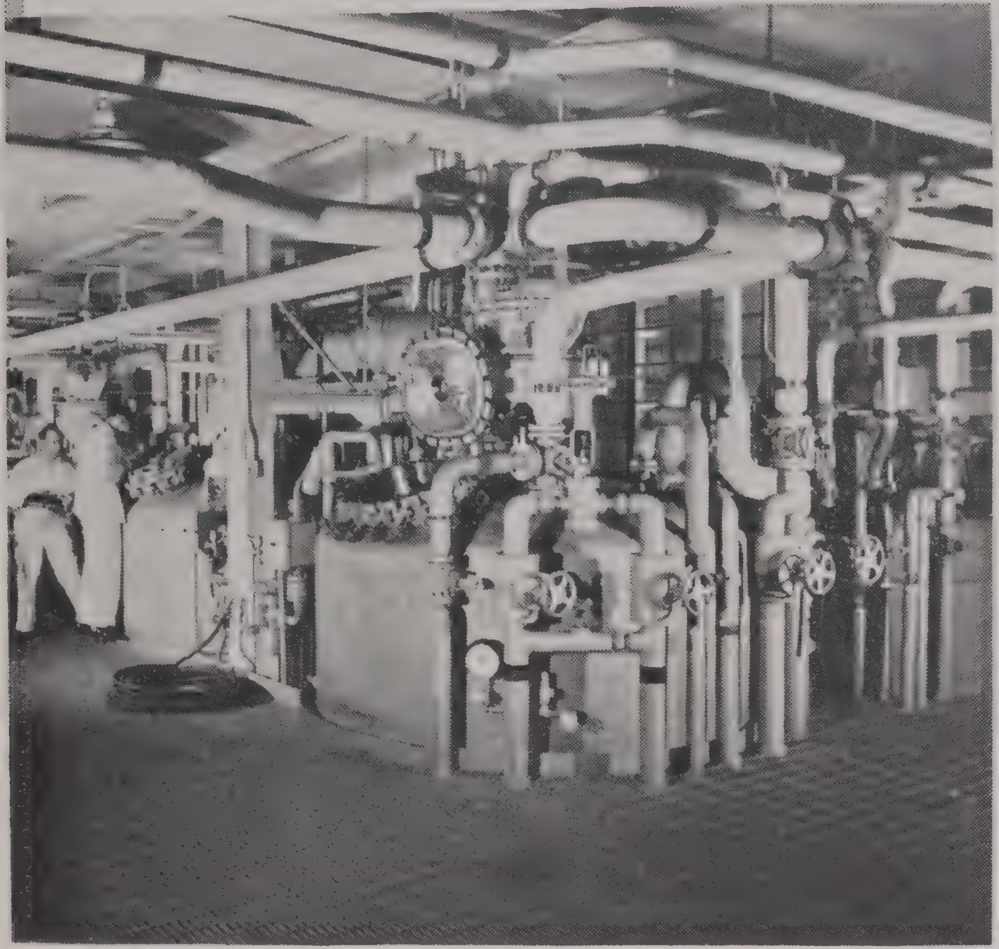
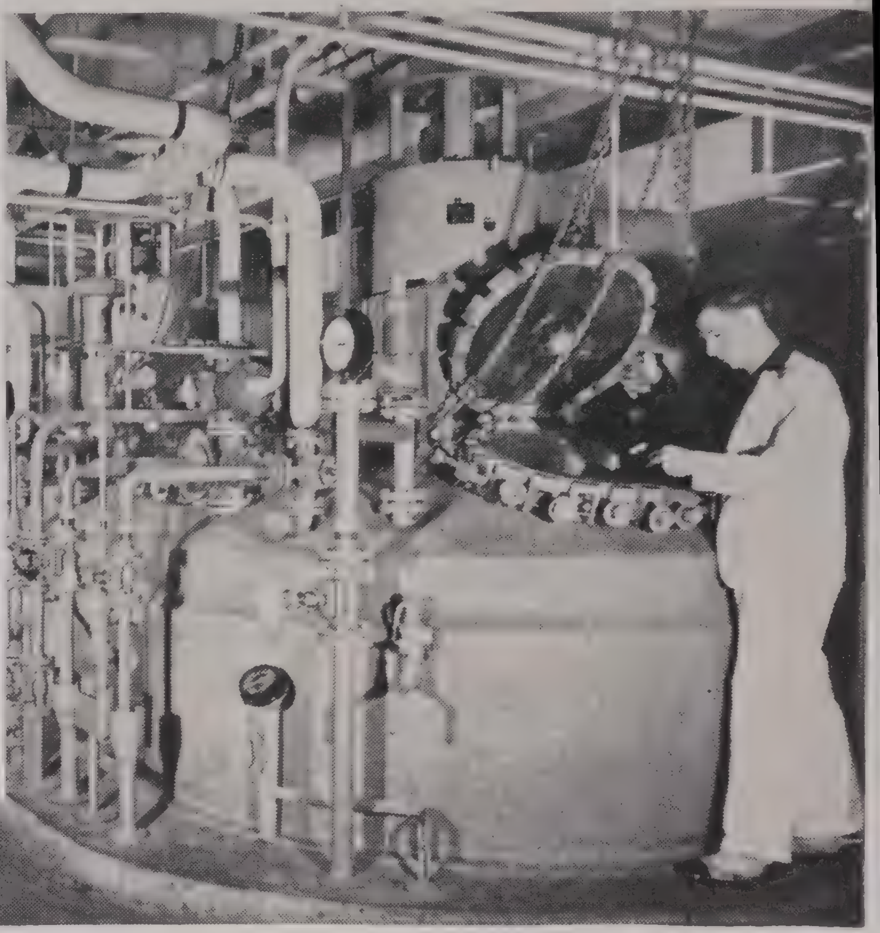
# For purity and maximum yield of Chloromycetin, *Parke, Davis & Company* chose Inconel-Clad Steel protection



*Above:* Cultures started in 50-gallon Inconel containers are transferred to 500-gallon Inconel-Clad Steel fermenters and then into these 5000-gallon Inconel-Clad Steel fermenters, where full growth is attained.

*Below:* In the foreground, two 3000-gallon Inconel-Clad Steel acid adjustment tanks, built by National Annealing Box Company of Washington, Pennsylvania.



Inconel surfaces, in solid or clad steel construction, are used predominantly for contact with Chloromycetin in all stages at the new Parke, Davis plant in Detroit. Thus there's no corrosion to harm the product; it is pure and crystalline. Fermentation proceeds unhindered by metallic contamination, giving maximum antibiotic production.

Parke, Davis & Company selected Inconel and Lukens Inconel-Clad Steel because of many years' experience with them in the production of other sensitive pharmaceuticals. H. K. Ferguson Company co-operated in the design of all equipment here.

In addition to Inconel-Clad Steel, Lukens also makes Stainless-Clad, Nickel-Clad and Monel-Clad Steels—uniform claddings of these corrosion-resistant metals (usually 10% or 20% of total plate thickness) permanently bonded to steel backing plate. All are available in the extra-smooth sodium hydride finish.

Bulletin 449 tells you more about Lukens Clad Steels. For a copy, write Lukens Steel Company, 401 Lukens Bldg., Coatesville, Pennsylvania.

CLAD METAL STEEL

**LUKENS**

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Inconel-Clad Monel-Clad
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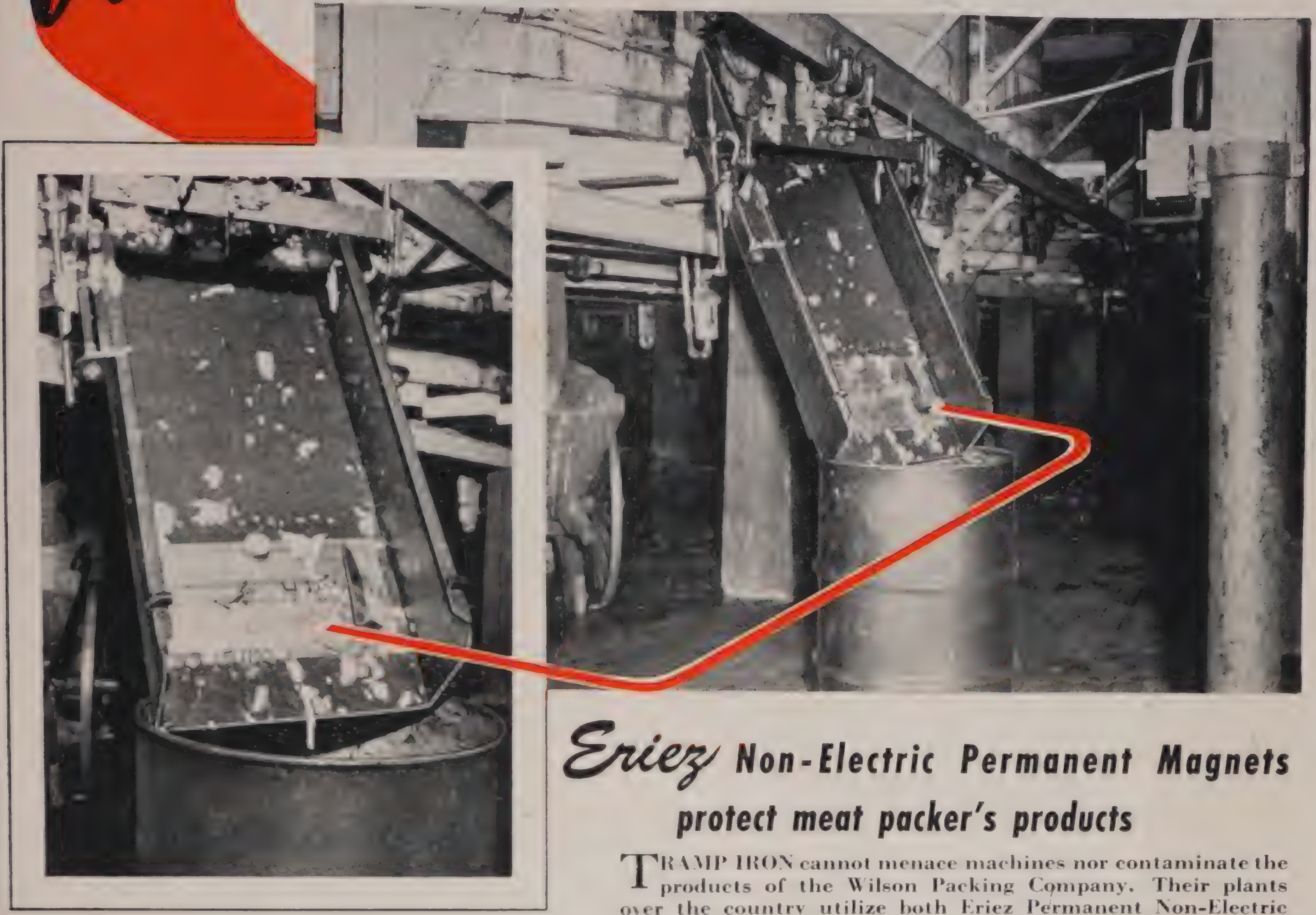
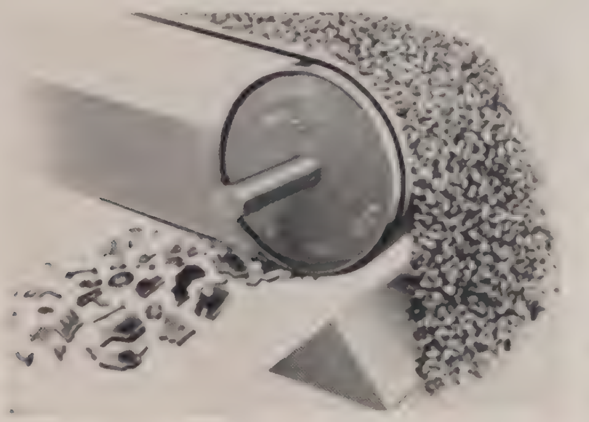
*at* WILSON PACKING CO.



*Eriez* Non-Electric Permanent Magnets
protect meat packer's products

TRAMP IRON cannot menace machines nor contaminate the products of the Wilson Packing Company. Their plants over the country utilize both Eriez Permanent Non-Electric Magnetic Pulleys and Plates to provide essential protection from tramp iron and assure purity of product. For example, United Chemical & Organic Products Division of Wilson & Company utilize Eriez Giant Magnets to remove tramp iron from the residue of their gelatine processing lines at their Calumet City, Illnois, plant. Machines used for subsequent processing of this residue are thereby protected. Notice the accumulation of tramp iron stopped by this unit. Engineered to fit the job of ferrous metal separation at hand, Eriez builds magnets in a variety of sizes and strength to meet each and every application. The intense penetrating magnetic power of Eriez Magnets prevents machinery damage, accidents to personnel, and assures purity of product throughout industry at a minimum of cost.

Furthermore, Eriez Magnetic Protection can be installed and forgotten on the cost sheet. No electrical equipment is needed, no current, no costly maintenance of switches, coils, rectifiers—First Cost is Last Cost. Eriez Magnets are Permanent in Penetrating Power. From the complete Eriez Line You Get the Correct Magnet for the Job.



Wilsons' also use Eriez Pulleys to protect fat expellers from damage.

"See our exhibit at the 22nd Exposition of Chemical Industries, Grand Central Palace, New York—November 28 to December 3, 1949"

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*Write for bulletin 108-*

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LaTouraine
extra fine Coffee
BEN-HUR
GREEN
TEA

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Cocomalt
MALTED FOOD DRINK
Dainty Dot
GROUND CINNAMON

**BOND Line:** Cocoa, chocolate and malt drink mixes, ground spices, cake and muffin mixes, baby food powders, etc.

*Won't you send us samples of your products? We'd like to have the opportunity of recommending the U.S. machine to suit your particular requirements.*

US

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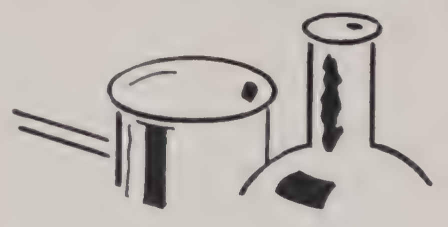
FOIL

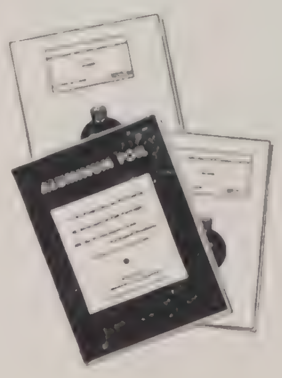
## ALCOA PACKAGING REPORT NO. 49-5

# Under-water test proves Alcoa Foil Wrap keeps powdered foods bone-dry!

**OBJECT OF TEST:** Determine the suitability of heat-sealed envelopes made from .001″ soft Alcoa Aluminum Foil, for packaging prepared synthetic lemon powder. Some packages were immersed under water for 30 minutes . . . others stored for 90 days in temperature of 106° F. plus 90% relative humidity.

**CONCLUSIONS:** "All aluminum foil packages satisfactorily passed the tests. After the 90-day storage period, no moisture was observed. The packages tested under water at 100mm reduced pressure developed no leakers." Again Alcoa Foil proves it has a moisture-vapor transmission rate of practically zero. Can give better protection . . . longer . . . to an infinite variety of products—from tire tube patches to dehydrated foods. For further information about Alcoa Aluminum Foil, and the names of package manufacturers experienced in working with foil, write ALUMINUM COMPANY OF AMERICA, 1845L Gulf Building, Pittsburgh 19, Pennsylvania.





*Facts on Foil*—Further information on the results of Alcoa Packaging Laboratory tests is available. Write us concerning your packaging problems.

ALCOA ALUMINUM

REG. T. M.

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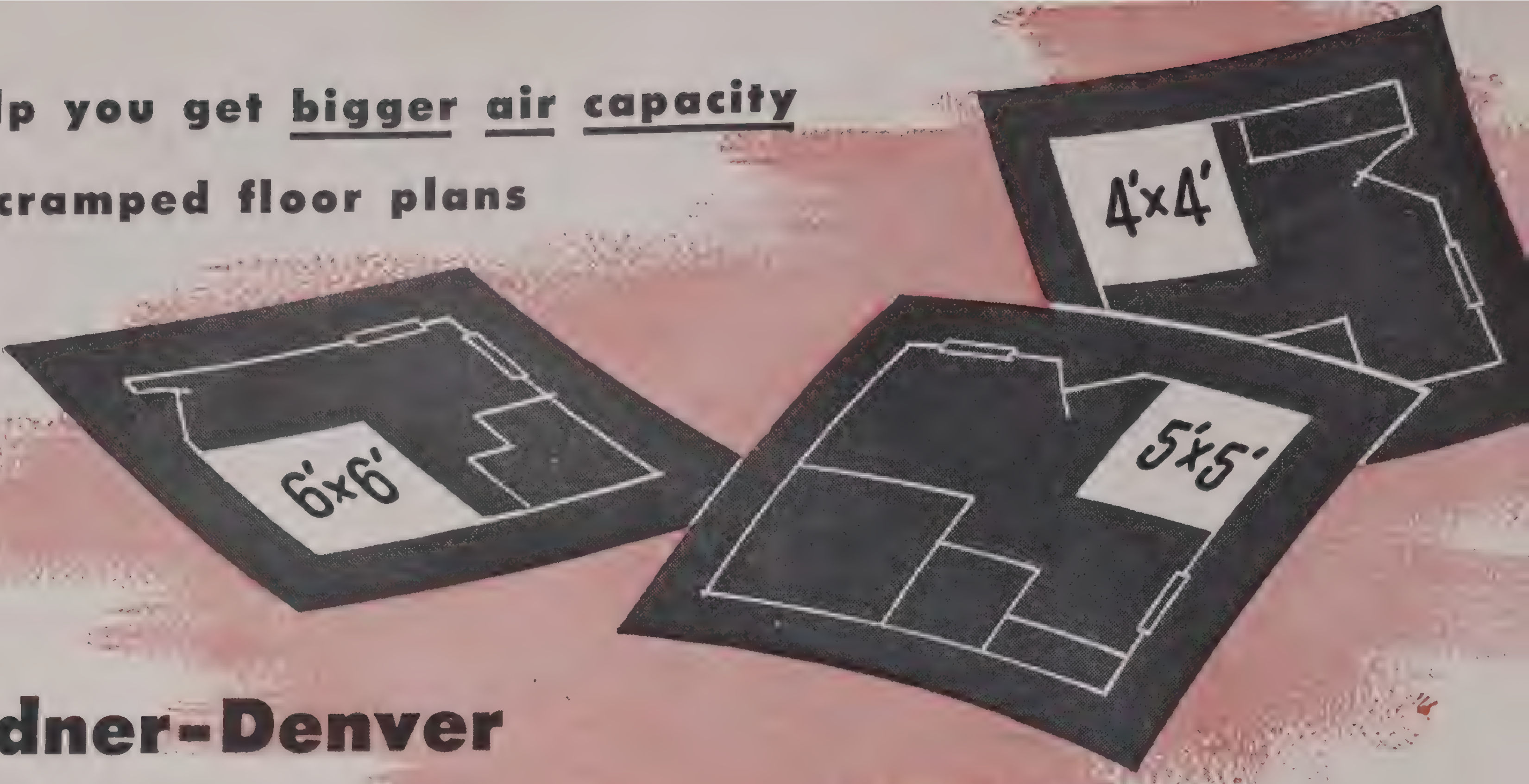
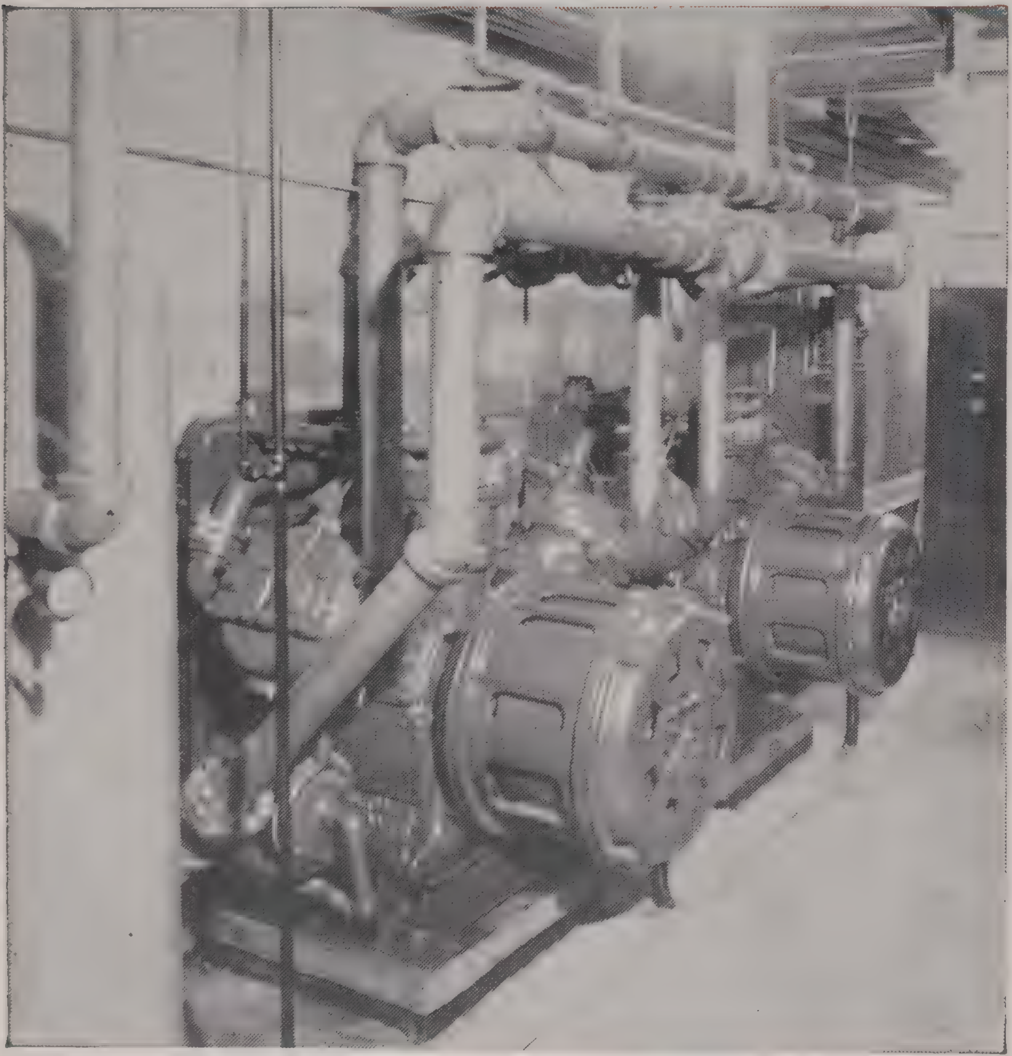
**To help you get bigger air capacity**
**from cramped floor plans**



# Gardner-Denver "WB" Compressors

# are made in 7 sizes!



*Compact Gardner-Denver "WB" Two-Stage, Vertical Water-Cooled Compressors, with built-in motors.*

Here's how you can have *greater air capacity* – even though floor plans are crowded! Install Gardner-Denver "WB" — the vertical, two-stag compressor that's built in seven space-saving capacities from 142 to 686 cubic feet displacemen per minute. The smallest size fits into a four-foo square — the largest requires only about six fee each way.

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- ★ Timken tapered roller main bearings.
- ★ Force-feed lubrication system.
- ★ Furnished with built-in motor — or with sheave for "V"-belt drive.

For complete information, write Gardner-Denver Company, Quincy, Illinois
In Canada: Gardner-Denver Company (Canada) Ltd., Toronto, Ontario

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**WORKS: Sharon, Pa., East Chicago, Ind.**

**Be smart about your business . . . demand uniforms o**

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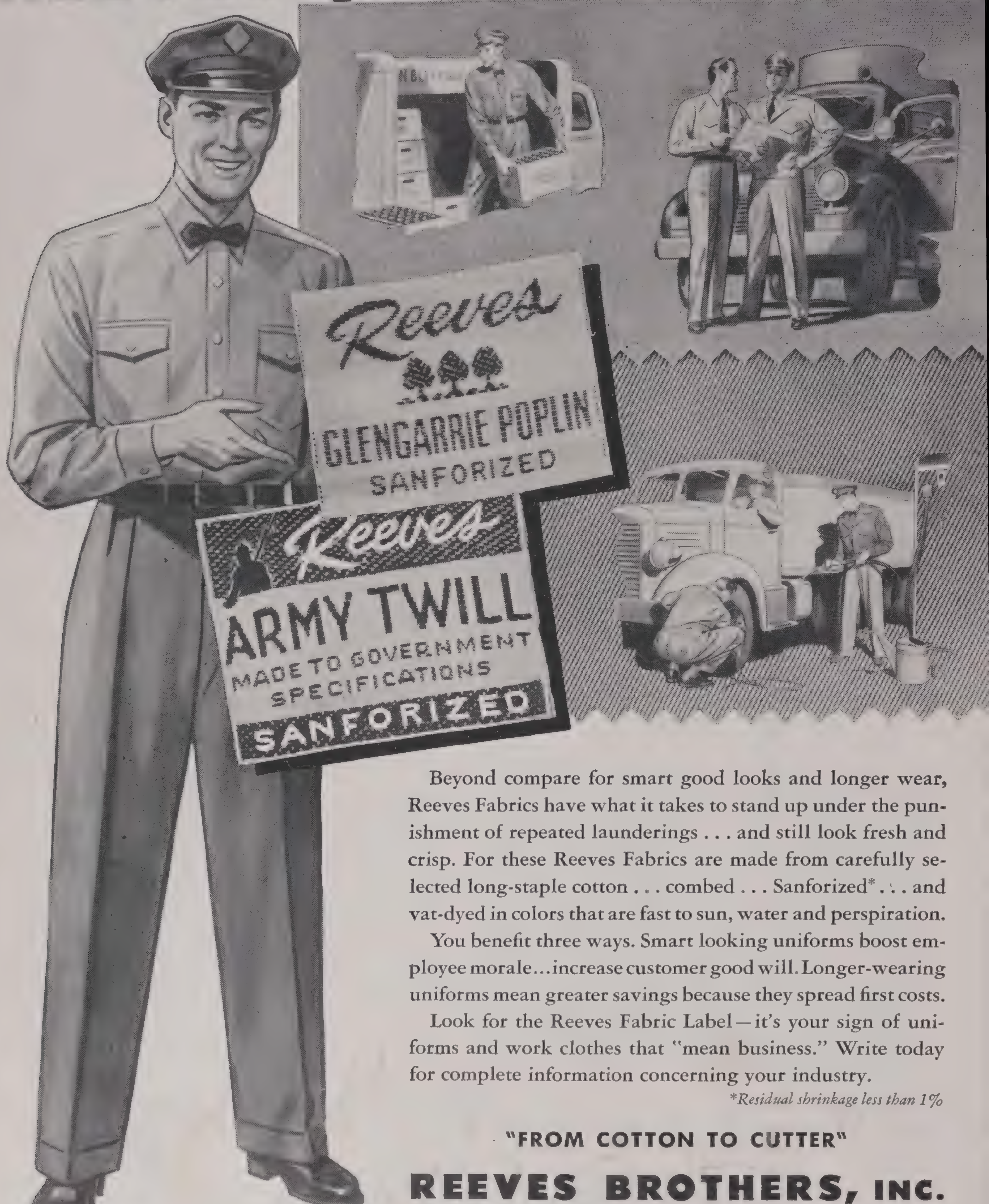

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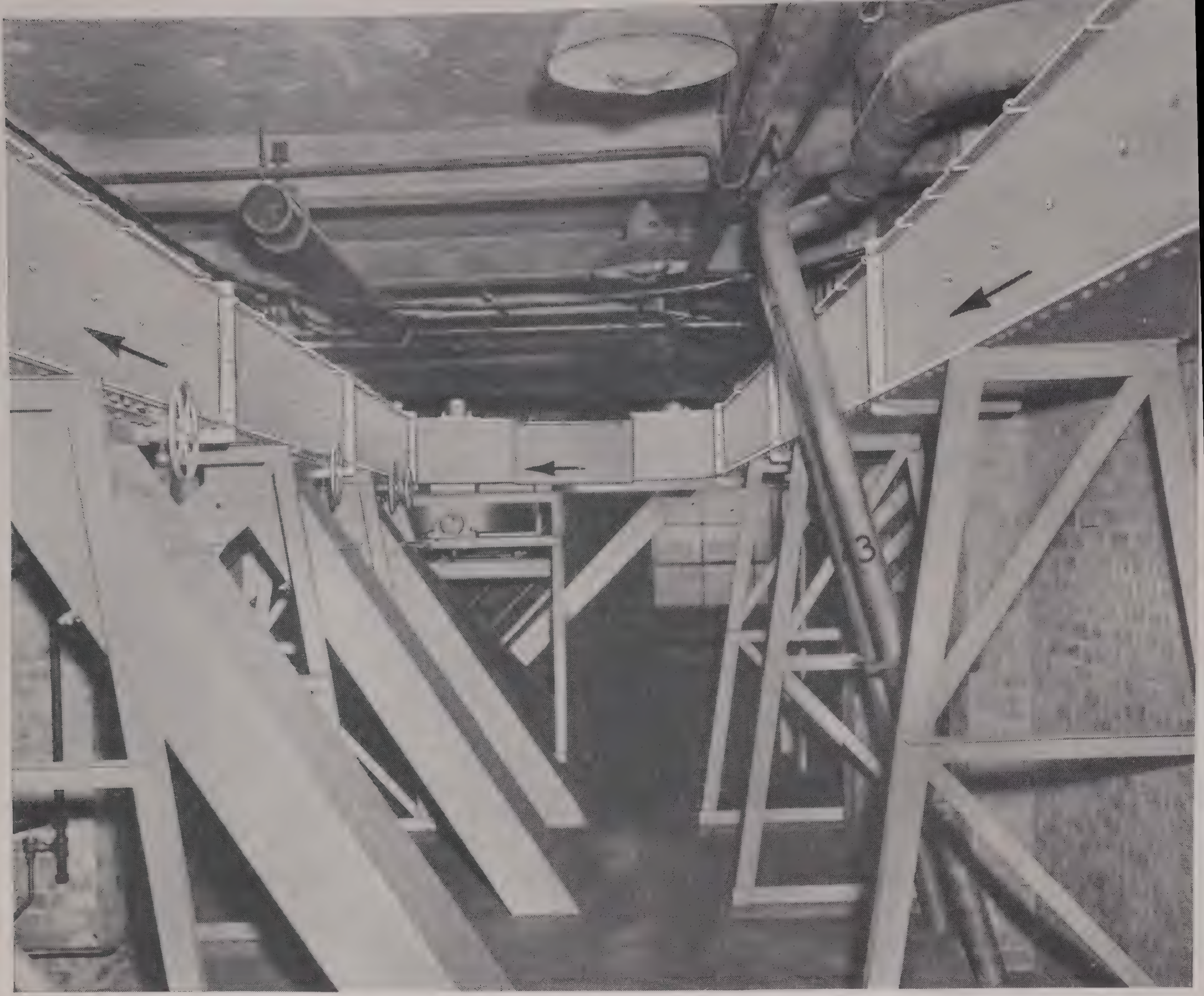
**CONTROL** — Manual, magnetic and combination starters; push button stations and components for complete control systems.

**PUMPS** — Integral motor and coupled types. Sizes and ratings to 2500 GPM.



# Keeping Malt On the Move

Only a horizontal, closed-circuit REDLER conveyor with its special ability to recirculate malt not immediately needed would meet the recommendations of S-A engineers for this Milwaukee brewer. In addition, REDLER conveyor's enclosed, dust-tight construction prevents spillage and keeps product free from outside contamination.

Many years of experience with the bulk handling problems of the food industries enable S-A engineers to plan and install conveying systems to do the most work at the lowest possible cost-per-ton.

Ask S-A engineers for their recommendations of a system to meet your specific need. There's no obligation . . . write today!

MILLER BREWING COMPANY
MILWAUKEE, WISCONSIN

*On the 10th floor of the brew house a horizontal closed-circuit REDLER conveyor automatically distributes barley malt by means of gate regulated multiple spouts into 16 separate storage bins on the floor below. When bins are full, REDLER conveyor simply recirculates malt until an empty bin needs feeding. Conveyor cannot be overloaded as only enough malt enters feed point to make up a normal load. System handles 47 tons of malt per hour.*

**STEPHENS-ADAMSON**
6 Ridgeway Avenue, Aurora, Illinois · MFG. CO. · Los Angeles, Calif. • Belleville, Ontario

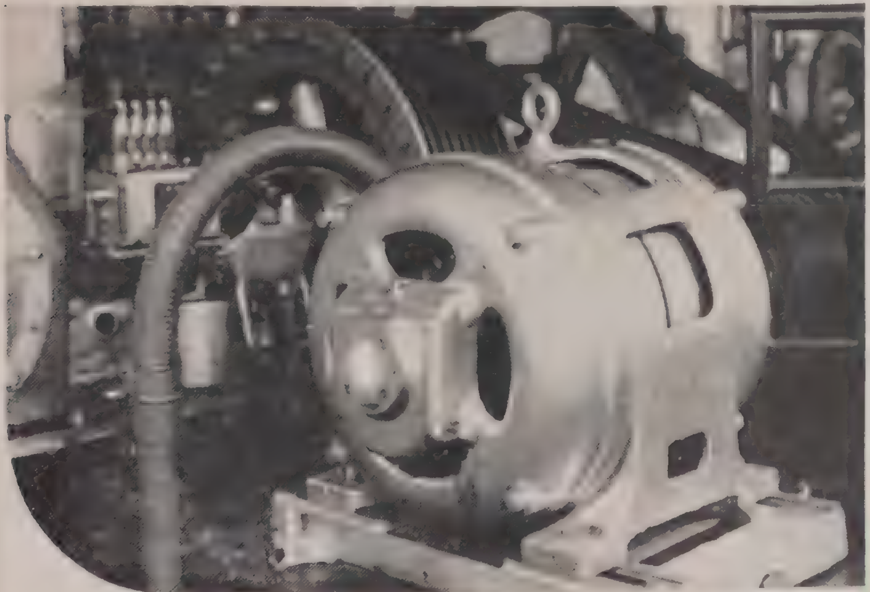
**DESIGNERS AND MANUFACTURERS OF ALL TYPES OF BULK MATERIALS HANDLING EQUIPMENT**

Century 40 horsepower, type SC motor driving an induced draft fan for a stack.

# From Century's Line of Electric Motors You Can Select

## ① Right Kind—to match your current supply
## ② Right Type—to meet your load characteristics
## ③ Right Protection—against atmospheric hazards
## ④ Right Size—from 1/6 to 400 horsepower

Century 150 horsepower, type SC motor driving a two-stage centrifugal pump in a city water plant.



Two Century 75 horsepower SC high torque motors driving refrigeration compressors.

The wide range of kinds, types and sizes of Century motors makes it possible to select a standard motor to meet the requirements of all popular applications.

They are available for both AC and DC current—high, normal and low torque characteristics. Types are also available for applications requiring varying speeds and reversing direction of rotation.

To protect against atmospheric hazards, Century motors are enclosed in open rated drip proof, splashproof, totally enclosed fan cooled and explosion proof frames. Many types are available with vertical and flange mountings as well as standard horizontal bases.

Specify Century motors for all your electric power requirements.

Popular sizes and standard ratings are generally available from factory and branch office stocks.

Century C Motors

**CENTURY ELECTRIC CO.**
1806 Pine Street, Saint Louis 3, Missouri
*Offices and Stock Points in Principal Cities*

-624

It looks dependable
and it is . . . the
ANCHOR* DEEP SCREW CAP

THE *Anchor* Deep Screw Cap provides a
pendable airtight and leakproof seal. Its se
ing efficiency is due to its scientifically design
deep rolled thread which improves holding qu
ties on min. glass; permits ample clearance o
glass thread, prevents binding and gives a spin
action for fast, low-cost application.

The *Anchor* Deep Screw Cap has deep, coa
knurls, which are rolled out to avoid interferen
with the top of the glass thread, permit free rad
movement of the liner and provide a firm
gripping surface.

Its unique thread construction and deep knurl
combine to make the cap easy to apply, remo
and replace.

*Reg. U. S. Pat. Off.

ANCHOR HOCKING
GLASS CORPORATION
[illegible]

# SPEED PRODUCTION with Uniform Anchorglass*

OW-DOWNS and shut-downs on your production lines mean lost time—lost profit. Avoid n. Pack in shock-resistant, uniform *Anchorglass* tainers—they're strong—designed and manu- ured to stand up on modern, high speed duction lines.

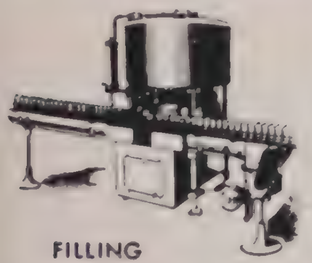
ough, sturdy *Anchorglass* Containers are the end lt of practical engineered designs, consistency nanufacture, uniform distribution of glass, urate temperature controls in annealing, quality trol through laboratory tests, regular inspections a constant emphasis on highest manufacturing ndards.

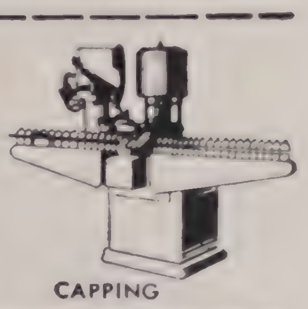
nchorglass Containers are available in all ular styles, capacities and finishes, in crystal, per and emerald green glass. Let us supply ples and prices.

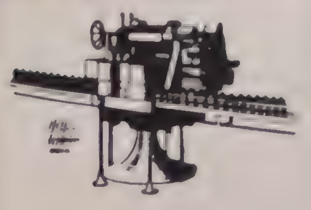
. U.S. Pat. Off.

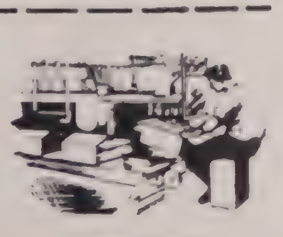
UNSCRAMBLING

CONVEYING


FILLING


CAPPING


LABELING


CARTONING

Anchorglass

**ANCHOR HOCKING**
**GLASS CORPORATION**
Lancaster Ohio

# NEW BAUSCH & LOMB *Juice* REFRACTOMETER

## USES *BOTH* TRANSMITTED AND REFLECTED LIGHT

**For the first time, a hand refractometer is now available that uses either reflected or transmitted light—transmitted light for clear, transparent solutions . . . reflected light for dense, opaque or turbid samples.**

**FOR QUICK, ACCURATE ANALYSIS** of citrus or vegetable juices . . . for easy on-the-spot checking in the plant or in the field . . . the new Bausch & Lomb Juice Refractometer is an ideal instrument.

**DIRECT READING** with no interpolation necessary. A precise scale, from 0 to 25% total solids, provides for readings made directly with high accuracy. Scale lines alternate on each side of the center line, even tenths on one side, odd tenths on the other . . . avoiding a crowded scale.

**WELL-DEFINED, COLORLESS DIVIDING LINE** assures accurate readings, speed and convenience. Angles of prism faces, and the selective compensating filter make the dividing line sharp. Self-seating cover prevents damage to prisms.

**FOCUSING EYEPIECE** adjusts to accommodate individual user's eyes. Combined with an easy-to-read internal scale, this helps eliminate guesswork in routine refractometric observation. Wide aperture gives complete unobstructed view of entire scale and borderline.

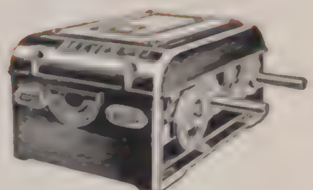
**WRITE** for complete information and demonstration of the new B&L Juice Refractometer. Bausch & Lomb Optical Co., 603-K St. Paul St., Rochester 2, N. Y.

## BAUSCH & LOMB *Juice* REFRACTOMETER

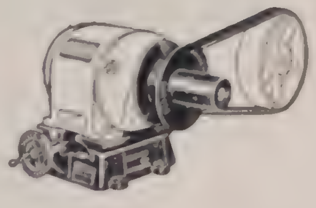
"Looks like Bascom has fallen in love with that new, Reeves-equipped machine"

## THE 3 BASIC REEVES UNITS

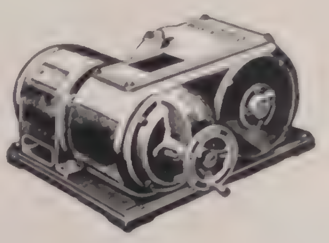
**VARIABLE SPEED TRANSMISSION** for providing infinite, accurate speed flexibility over a wide range—2:1 to 16:1. Sizes—fractional to 87 hp.



**VARI-SPEED MOTOR PULLEY** provides an instantly variable speed drive within 4:1 ratio for any constant speed motor. Sizes to 10 hp.



**MOTODRIVE** combines motor, speed varying mechanism and reduction gears in single unit. Speed variations 2:1 to 6:1 inclusive. Sizes to 20 hp.



Give your workers machines that are equipped with REEVES Speed Control and they'll give you a better, more profitable day's work. With the turn of a wheel or touch of a button, each individual operator can obtain—instantly and accurately—the precise machine speed at which he can turn out the *most* work and the *best* work commensurate with his own, individual ability. Make sure the new machines you buy are REEVES-equipped. Install REEVES Speed Control on machines already in service. Your employees will appreciate it . . . and you will appreciate it when you see the resultant improvement in quantity, quality and cost of production. Write for Catalog No. FD21-3N.

**REEVES PULLEY COMPANY • COLUMBUS, INDIANA**

***Recognized Leader in the Specialized Field of Speed Control Engineering***

**ACCURATE • VARIABLE**

***Reeves Speed Control***

**GIVES THE RIGHT SPEED FOR EVERY JOB!**

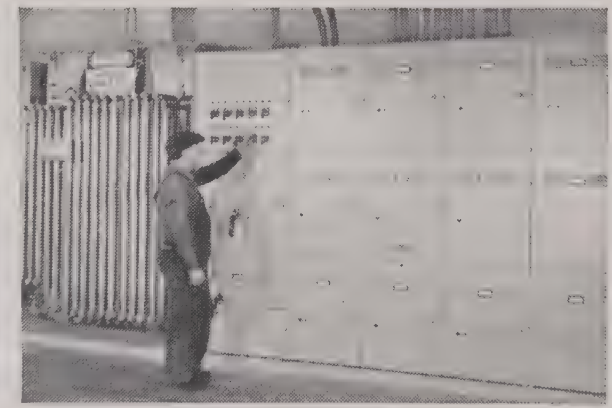
# electrically co-ordinated to process beets —at 2 tons a minute!

New $5,500,000 beet sugar plant looks to electric equipment supplied and engineered by General Electric to help maintain high processing output.

The American Crystal Sugar Company's new plant at Moorhead, Minnesota, is another example of an electrical system equipped and co-ordinated almost entirely by General Electric. Playing an indispensable part in the plant's high output of granular and powdered sugar and dry beet pulp, this G-E system needs little or no maintenance attention, helps cut over-all processing costs!

Whatever the food you process or the size of your plant, you, too, can profit by discussing your electrical needs with a G-E industry specialist. From a complete, integrated plant system geared to continuous processing, to motors and control for a single operation, his advice can be counted on to help quicken production, cut costs. Call him today at your nearest G-E office. *Apparatus Dept., General Electric Company, Schenectady 5, N. Y.*

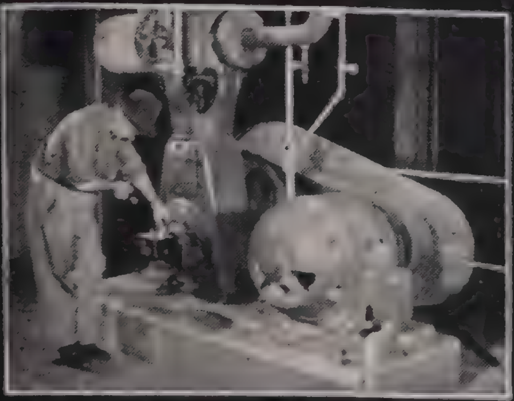
**1** The Moorhead plant, put into operation last fall, has a G-E Turbo-Alternator with a power capacity of 2500 kw. Shown here is G-E Metal-Clad switchgear with 4 magne-blast air circuit breakers, rated at 600 amperes, 4160 volts. Units are completely metal-enclosed for personnel safety. Bulletin GEA-3083.



**2** Four G-E unit substations (one shown here) are placed in load center areas throughout the plant to step down power from 4160 volts to 440 volts right where it's needed. This eliminates voltage drop caused by long, low-voltage feeders. Compact and space-saving, G-E unit substations are quickly, inexpensively installed. Bulletin GEA-3758.

**3** Controlling Tri-Clad ® motors on scrolls, agitators and pumps are these two G-E Cabinetrol ® equipments, providing centralized low-voltage motor controls in compact, factory-assembled "packages." Rigid steel enclosure protects workmen, keeps out dust. Bulletin GEA-3856.

GENERAL ELECTRIC



**4** About 85 per cent of the motors in this new plant are of Standard G-E Tri-Clad construction, triply protected against physical damage, electrical breakdown, and operating wear and tear. This Tri-Clad open (drip-proof) motor drives one of the plant's air compressors. Bulletin GEA-3580.

**5** At locations such as this where motor operation might be affected by powdered or granular sugar, the new plant uses G-E totally enclosed fan-cooled motors. This one drives a 100 lb. valve bag machine for sacking granular sugar. Bulletin GEA-4400.

**6** These three G-E Type CR-1062 switches on the 5-lb. sacking line control the filling turret and conveyor, the spanker, and the scale. Used for small single and three-phase motors, these compact switches provide complete protection against injurious overload conditions.

**Co-ordinated Electrical systems for food plants**

# NEW—

# A COST-SAVING SERVICE *for motor users!*

Here's a new way for you to cut motor repair costs, machine downtime, spare-motor inventories. With General Electric's Tri-Clad Motor Exchange Plan, you can now replace an ailing motor without long, costly production delays.

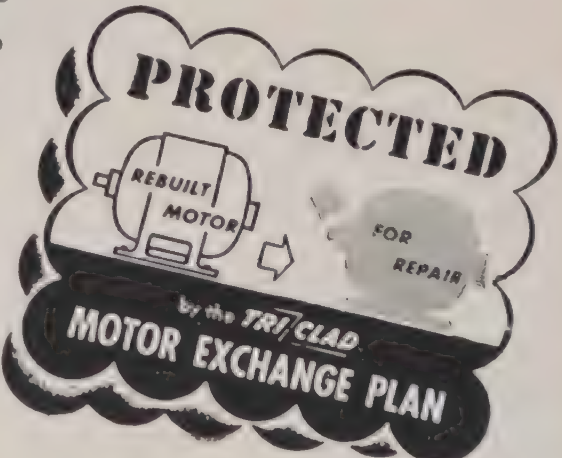
### The plan is simple

All you have to do is call your regular motor supplier. Quickly, without red tape, he exchanges your inoperative motor for a factory-reconditioned motor of the same type and rating, with a new-motor warranty.

### The cost is low

You can exchange motors less than a year old free of charge. Those with from one to five years of service are exchanged at a small fixed charge. For motors over five years old, the fixed charges are slightly higher.

The exchange plan now includes Tri-Clad Type K, KC, and KCJ standard general-purpose motors from 1 to 5 hp—covering many food plant needs—and will soon be extended to other Tri-Clad types. See Bulletin GEA-5189.



**WANT MORE DATA?**

General Electric Company, Section C652-3
Apparatus Department, Schenectady 5, N. Y.

Please send me the following bulletins:

- ☐ GEA-3083—Metal-Clad Switchgear
- ☐ GEA-3580—Tri-Clad open dripproof motor
- ☐ GEA-3758—Load center unit substations
- ☐ GEA-3856—Cabinetrol
- ☐ GEA-4400—Tri-Clad totally enclosed motor
- ☐ GEA-5189—Tri-Clad motor exchange plan

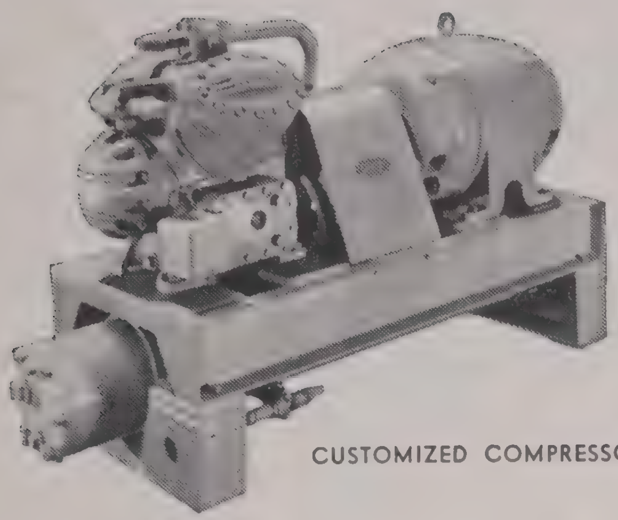
Name ……………………

Company ……………………

Street ……………………

City …………………… State ……………

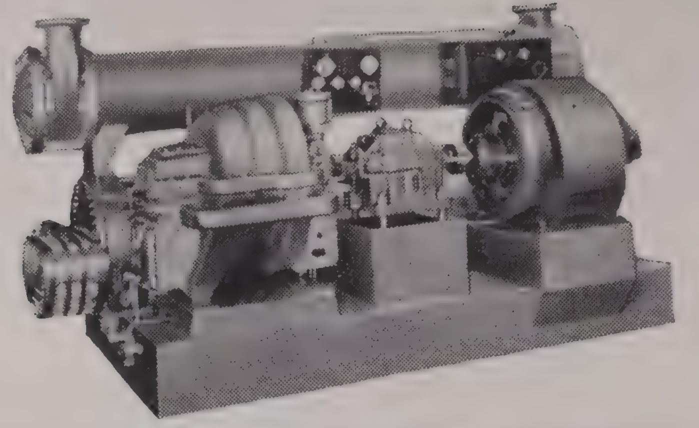
# Field-tested for EFFICIENT REFRIGERATION


CUSTOMIZED COMPRESSOR

### CARRIER RECIPROCATING COMPRESSORS

Unusually compact Customized Compressors using "Freon" or ammonia. Components selected individually to fit the job exactly—your choice of more than 1000 combinations. Replaceable, interchangeable cylinder sleeves, bearings and valves. Up to 200 hp.

CENTRIFUGAL REFRIGERATING MACHINE



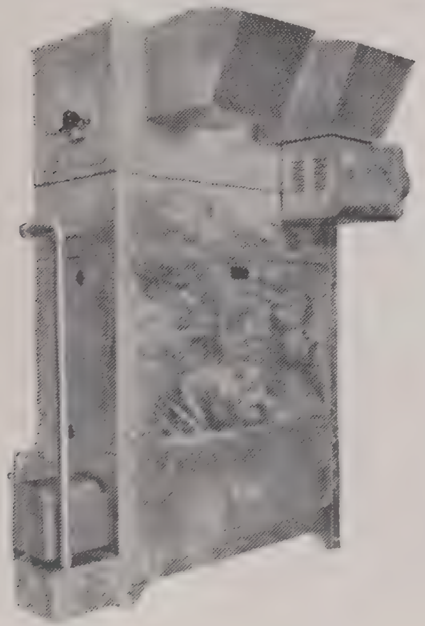
### CARRIER CENTRIFUGAL REFRIGERATING MACHINES

Capacities 100 tons and up. Available as multi-stage compressors of many sizes with corresponding cooler and condenser. Used for large refrigerating applications to supply temperatures as low as minus 100° F. and even lower.

### CARRIER COLD DIFFUSERS

Hot dip galvanized for long life. Recommended for medium and low temperature storage and freezing applications. Applicable for air distribution through ducts or outlets. Adaptable three ways — for direct expansion "Freon," ammonia or brine. Capacities—2 to 32 tons, 2770 to 16,500 cfm.

EVAPORATIVE CONDENSER



### CARRIER EVAPORATIVE CONDENSERS

Widely used with refrigerating compressors in place of water-cooled condensers to effect great savings in water costs, simplify water supply and disposal problems and eliminate cooling towers and pumps. Outdoor or indoor installation. Capacities — 7 to 75 tons.

COLD DIFFUSER

When you select a Carrier unit, you know beforehand it will deliver dependable, economical, efficient performance. There's a size and type for every need, each backed by Carrier know-how and precision manufacturing for years of service. Carrier co-operation is another asset to you and your customers. Carrier engineers welcome the chance to be of service to you. Carrier Corporation, Syracuse, New York.

**Carrier** AIR CONDITIONING • REFRIGERATION • INDUSTRIAL HEATING

# ETHAVAN

## flavors three instead of one

Whether you're making lollipops or fancy confections, Ethavan will flavor *three* for every one you can flavor with ordinary vanillin. The reason: Ethavan has *three* times the flavoring strength.

Flavored with Ethavan, your products have pronounced aroma that invites *first* purchases. They have taste-tickling vanilla-like flavor that brings folks back to buy again. Both the flavor and the aroma of Ethavan have such staying power that they are unimpaired by the heat or cold of processing and by the time required to pass through the channels of trade. Ethavan always is uniform, making it easier for you to get identical results in your production.

Look into the possibilities Ethavan offers you in improvement of your products or purchased flavor. You can get Ethavan in 5-pound and 25-pound cans. Samples, pamphlet and quotations will be sent promptly upon request. Mail the coupon, contact the nearest Monsanto Sales Office or write: MONSANTO CHEMICAL COMPANY, Desk L, Organic Chemicals Division, 1737 South Second Street, St. Louis 4, Missouri.

*Ethavan: Reg. U. S. Pat. Off.*

**DISTRICT SALES OFFICES:** Birmingham, Boston, Charlotte, Chicago, Cincinnati, Cleveland, Detroit, Los Angeles, New York, Philadelphia, Portland, Ore., San Francisco, Seattle. In Canada, Monsanto (Canada) Ltd., Montreal.

**FREE BOOKLET** — *"Something About The Senses" contains an interesting story and file-worthy data on flavorings. Mail the coupon today for your copy.*

**MONSANTO FLAVORS**

- Ethavan (Monsanto's ethyl vanillin)
- Methyl Salicylate Monsanto, U.S.P. (Synthetic oil of wintergreen)
- Vanillin Monsanto
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CHEMICALS AND PLASTICS

MONSANTO CHEMICAL COMPANY
Desk L, Organic Chemicals Division
1737 South Second Street, St. Louis 4, Missouri

Please send, without cost or obligation, items checked: ___Sample and pamphlet on Ethavan; ___Booklet, "Something About the Senses."

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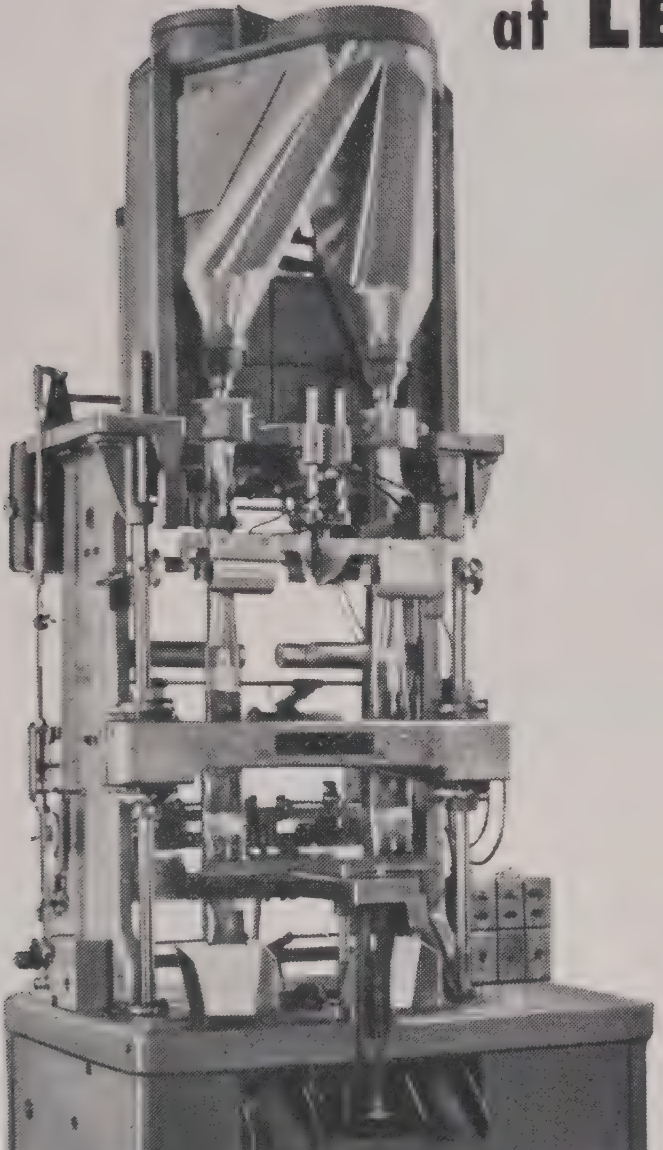
SERVING INDUSTRY...WHICH SERVES MANKIND

# TRANSWRAP

THIS READY-MADE
BAG, HAND-FILLED
Approximate Cost
Labor and Materials
**$7.00 per thousand**

THIS *AUTOMATIC*
TRANSWRAP PACKAGE
Approximate Cost
Labor and Materials
**$3.29 per thousand**

# AUTOMATICALLY produces a better-selling package at LESS than HALF THE COST



TRANSWRAP—industry's most practical and efficient packaging machine—forms, fills, seals and delivers a better-looking, better-selling package for your product. . .completely automatically.

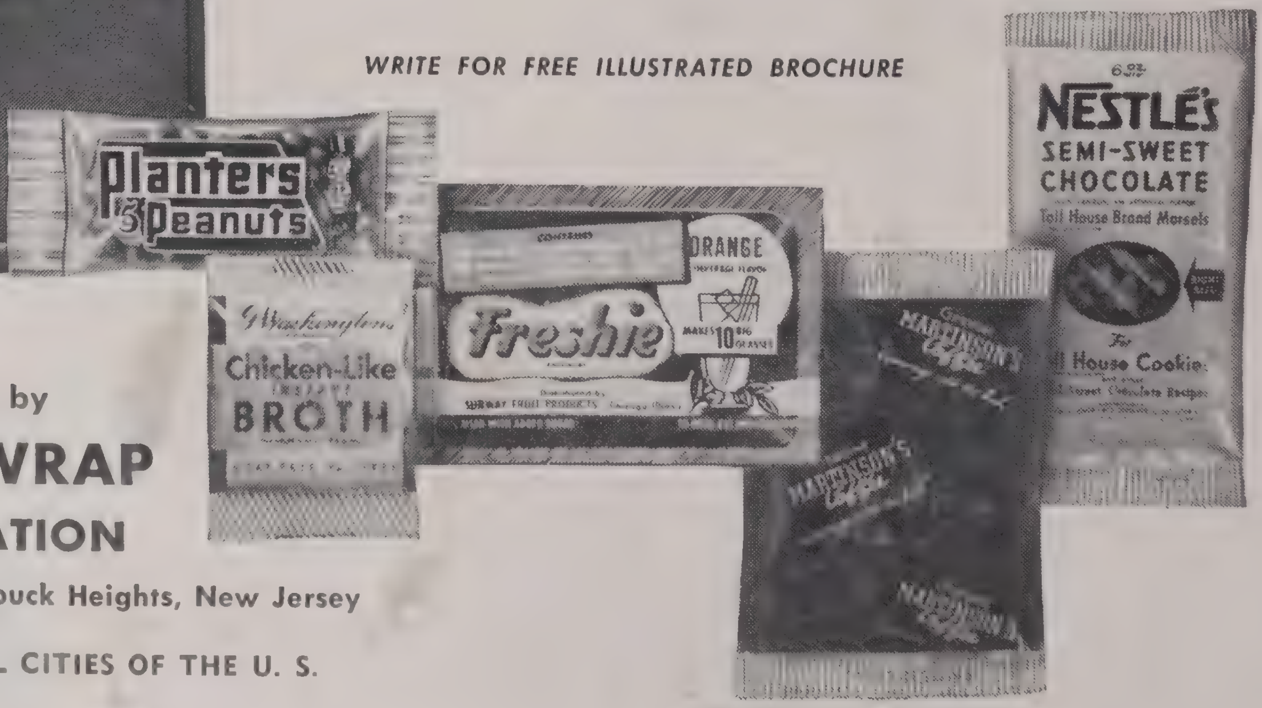
In cost, the *finished filled* TRANSWRAP units actually run less than half the price of ready-made *empty* bags for manual processing. And, because a single operator can handle a whole battery of TRANSWRAP machines, wage savings are phenomenal.

TRANSWRAP is equally efficient for powders, solids, tablets and even liquids. Standard packaging materials which may be used include cellophane, Pliofilm, glassine, roll foil or other suitable heat-sealing materials. Package capacities range up to 80 cubic inches in volume and often may exceed one pound in weight. Custom-engineered adaptations are possible to meet your individual requirements with maximum efficiency.

Model "B" Transwrap with auger feed. Also adaptable to Volumetric or liquid feed. Produces 40 to 75 pkgs. per minute.

Also Available—
Model "A" Transwrap
For small and unit packages.
(2⅜" x 6" Max.) Speeds to
150 pkg/min.

*WRITE FOR FREE ILLUSTRATED BROCHURE*


Planters Peanuts
Washington's
Chicken-Like
Instant
BROTH
ORANGE
Freshie
Makes 10 Big Glasses
Martinson's Coffee
Nestlé's
Semi-Sweet
Chocolate
Toll House Brand Morsels
Toll House Cookie

Manufactured and Sold by
**TRANSPARENT WRAP**
**MACHINE CORPORATION**
Route 17 and Henry Street, Hasbrouck Heights, New Jersey

REPRESENTATIVES IN PRINCIPAL CITIES OF THE U. S.

# CORROSION COSTS INDUSTRY

# $6,000,000,000.00

# ANNUALLY!

**How much do you pay?**

FOLLOW THE LINE OF *most* RESISTANCE
Amercoat
A SYSTEM OF SURFACE PROTECTION

## Don't risk needless waste

If all corrosion were as obvious as it is in steel pipe, industry would do more about it. But it is not. Often hidden or unnoticed – indoors and outdoors, above ground and below ground – corrosion takes its daily toll. Acids, alkalis, salts, gases and atmospheric conditions all are contributing factors. As a result, industry pays a terrific bill for corrosion – far more than it should. Your own cost, too, may be greater than necessary. Minimize your risk – do these two things now –

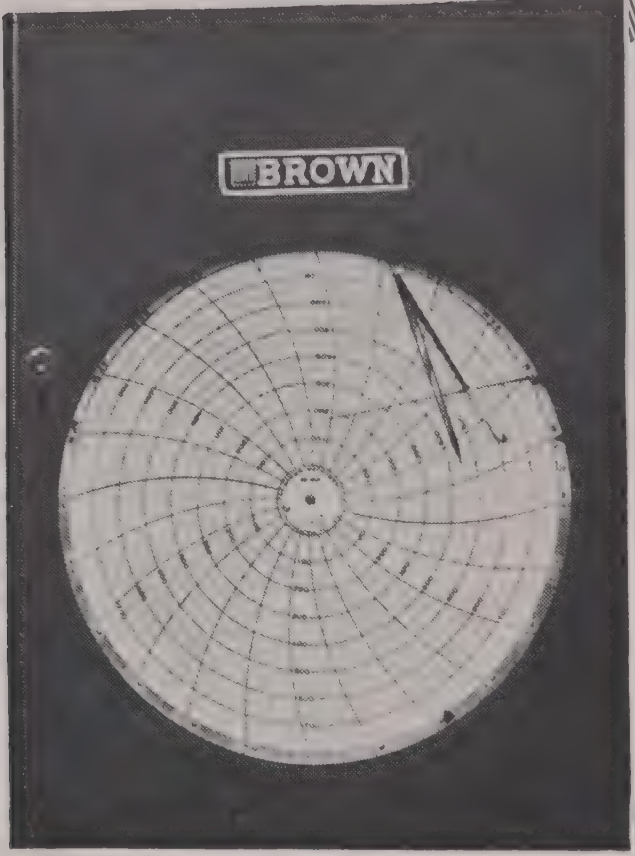
*1. Check up on your costs;*

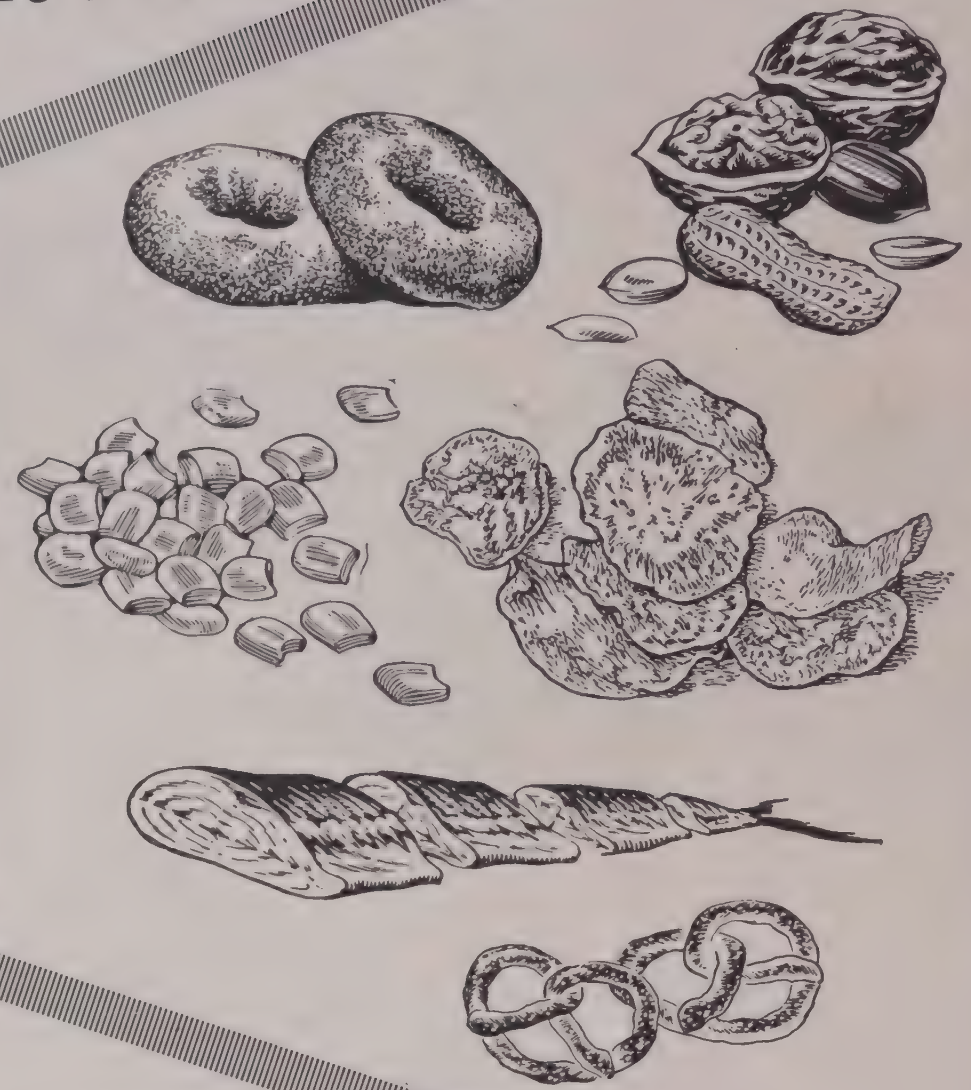
*2. Provide adequate protection for danger points.*

Experienced and competent AMERCOAT engineers are available to help you on both. They'll check up on your costs, which may be greater than you know because the effects of corrosion are often hidden. They'll report on conditions as they find them. They'll recommend steps to take if greater protection can be provided and money saved. Inquiries from interested executives will receive prompt attention. There's no obligation – write today.

**AMERCOAT DIVISION**
**AMERICAN PIPE AND CONSTRUCTION CO.**
**Dept. 3D, 4809 Firestone Blvd., South Gate, Calif.**

# Food For Thought...





# For Deep-Fat Fryers

Nuts, doughnuts, pretzels, potato chips, fish fillets, corn niblets and such . . . all are now being precision cooked in continuous deep-fat fryers with the help of Brown Instrumentation.

The control system is exceedingly simple and . . . with economies in time, labor and materials . . . helps change a costly batch operation to mass production processing.

Check these advantages:

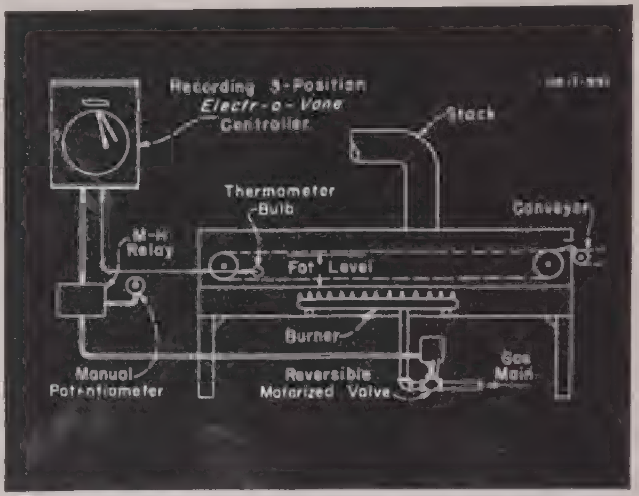
1. Uniform color and cook with maximum production.
2. Longer use of frying medium.
3. Less product spoilage.
4. Permanent time-temperature records for future reference and guide.

A Brown Recording 3-Position Controller is the heart of the system which may be varied to suit cooking medium, fuel, product and type of equipment.

Investigate this new technique today . . . call in your local Brown engineer or write for a copy of Data Sheet #3.2-7.

**MINNEAPOLIS-HONEYWELL REGULATOR CO.**
BROWN INSTRUMENTS DIVISION
4502 Wayne Ave., Philadelphia 44, Pa.
*Offices in 73 principal cities of the United States, Canada and throughout the world*

BROWN INSTRUMENTS
MH
WORLD'S LARGEST ORGANIZATION FOR ADVANCED INSTRUMENTATION AND CONTROL
MH
BELFIELD VALVES


Recording 3-Position
*Electr-o-Vane*
Controller
Stack
Thermometer Bulb
Conveyor
M-H Relay
Fat Level
Burner
Manual Potentiometer
Reversible Motorized Valve
Gas Main

*Schematic diagram of control system for continuous Deep-Fat Fryer*

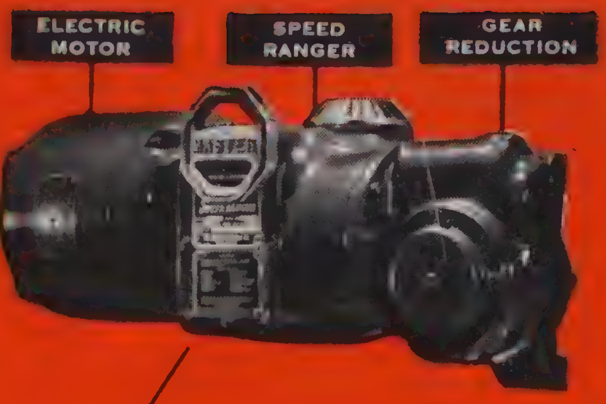
MINNEAPOLIS
**Honeywell**

*Advanced Instrumentation*
**FOR THE FOOD INDUSTRY**

**BROWN**
INSTRUMENTS

On thousands of applications in every field of manufacture, stepless variable speed operation assures exactly the right speed for every operation . . . for every operator . . . the right speeds for each change in the consistency or shape of the material being processed. Such variable speed operation pays off in higher rates of production, a more uniform better quality product and more efficient performance of your equipment and your operators.

Master Speedrangers provide this infinitely variable speed in an all-metal, mechanical variable speed unit whose compactness and durability are extra features which help you make a good job better. And nowhere else will you find variable speed drives that are so flexible, so easily adaptable and in such a wide range of types and sizes.



**again and again variable speed operation**

**makes a good job better**

For example, look at the plastic forming machine shown below. The Speedranger, on the drive unit incorporates an electric motor, a variable speed unit and a gear reduction . . . all standard Master units that easily combine into one compact, integral power package. This provides exactly the right speed, the right features, in a unit that you can mount right where you want it.

Probably you will not need this same combination of features. However, the next time you need a drive for material processing, handling, and conveying equipment; mixers and agitators; welding-positioners; macnine tool drives; testing and calibrating equipment . . . to name only a few . . . see what a really remarkable job Master Speedrangers can do for you. Write for Data 7525, new twenty-four page booklet on Speedrangers.

THE MASTER ELECTRIC COMPANY
DAYTON 1, OHIO

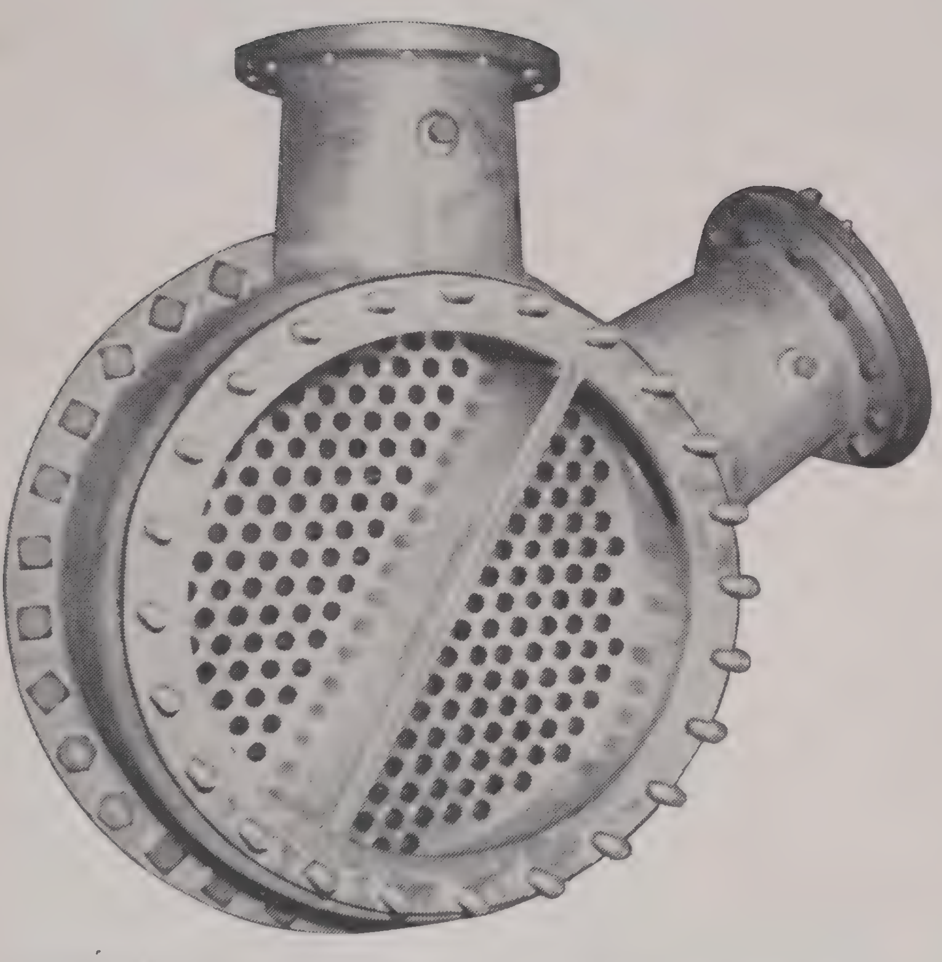
**especially when you use**

**MASTER SPEEDRANGERS**

*This is WHY*

**YOU GET LONGER EQUIPMENT LIFE**

*with Carpenter Stainless Tubing*



*Manifold for a 2-pass circulating heater. Rolling-in of Type 304 Carpenter Stainless Tubes reported to be easy, due to the consistent wall uniformity of material supplied from distributor stocks.*

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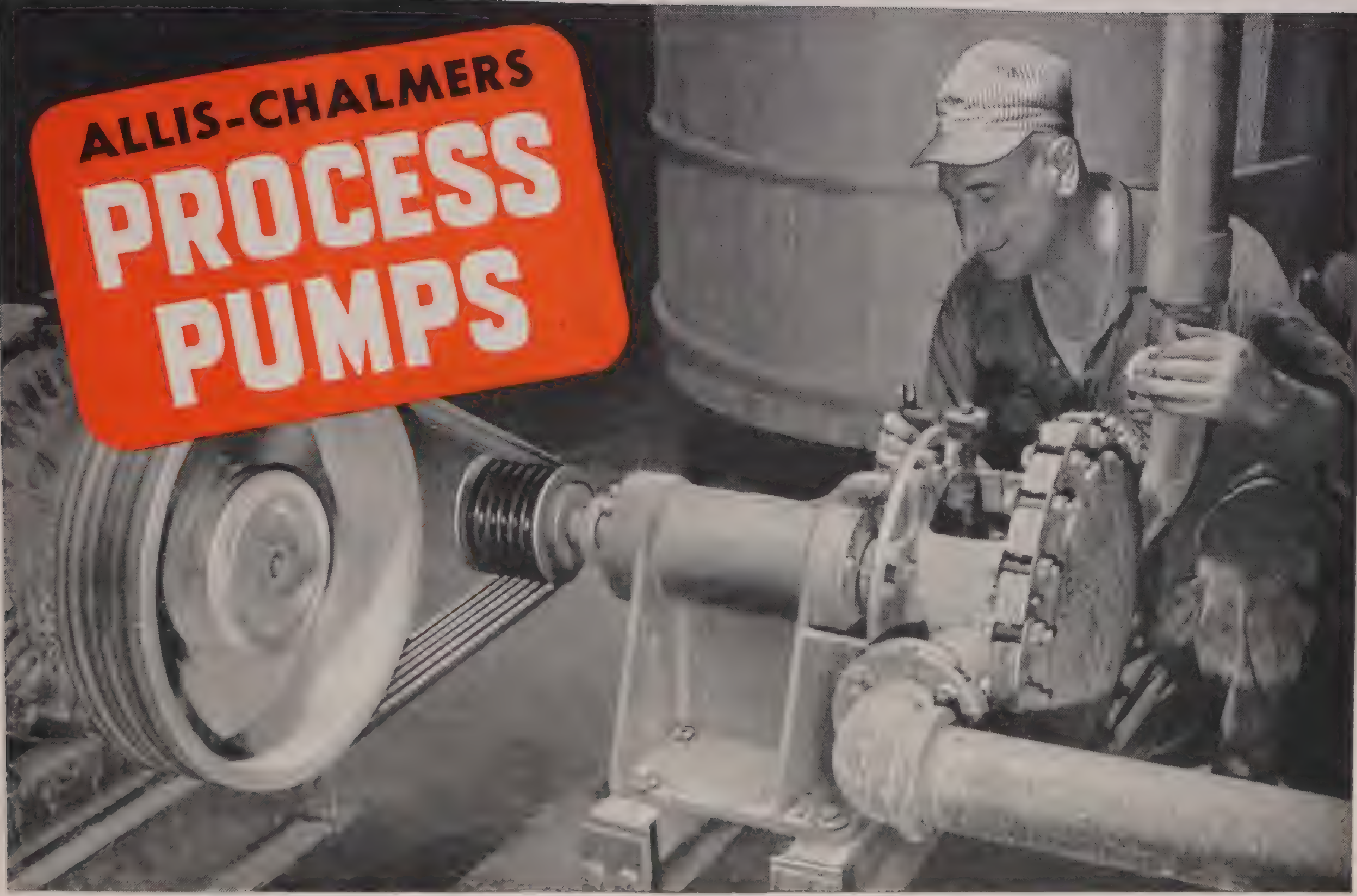

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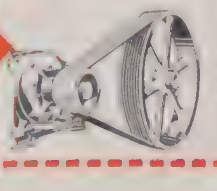

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Food
Industries

NOVEMBER, 1949

# Attack on A & P Foreshadows Trouble for Others

Ninety years ago a new retail food store opened for business on Vesey St., in what is now downtown New York. From that inauspicious beginning, The Great Atlantic & Pacific Tea Co. built a giant integrated food operation comprising some 6,000 stores, a number of large processing units, and a produce brokerage subsidiary. It does between 6 and 7 percent of the total retail food business of the country. Its prices are attractive to the housewife, its stores are modern and efficient, and the quality of its products is good.

The principal "secret" of A&P's success is giving consumers good values—the traditional American formula for success in business. In doing this it has contributed a fair share to progress in food distribution and processing.

We shall not go so far as to say that A&P is loved by everyone in the food processing and distribution fields. It has at times been a hard buyer and a tough competitor. And there are those who gained satisfaction in seeing the company attacked by the government.

But the attack on A&P is unjustified. More, it is a piece of a dangerous scheme on the part of government to "deconcentrate" business.

It is unjustified because—in the opinion of people who know what goes on in the food processing and distribution fields—A&P has been conducting its business properly and legally. And more, it has been a constructive influence in the industry and has rendered outstanding service to the public. It is no exaggeration to say that A&P has helped to lower food distribution costs, both through its own achievements and through the effect of its competition on other firms. In the same manner, the company has helped to maintain quality at a good level.

The government's action against A&P is dangerous, because if it succeeds it will be only the beginning. The intentions of Washington are clearly indicated by the fact that it has other cases pending, such as those involving the big four packers, two large Chicago dairies and a large can company.

It looks very much as if Washington's ideas of a welfare state include a leveling off of business stature—just as individual incomes are being leveled. This will remove the incentive for business to progress and grow in size and service to the public—just as it is destroying the incentives for individuals to take on greater responsibilities.

To get a quick concept of what such a move on the part of government would mean in the food processing field, consider a few figures recently compiled by the FTC on what it calls "concentration of productive facilities." These show that eight meat packing companies owned 77.6 percent of the net capital assets of all corporations in that industry in 1947. Eight canners and preservers owned 51 percent of capital assets in their field. The figure for eight grain millers was 48.6 percent; for eight bakers of bread and other products, 38.3 percent; for six biscuit and cracker bakers, 72.2 percent; and for eight dairy companies, 71.3 percent.

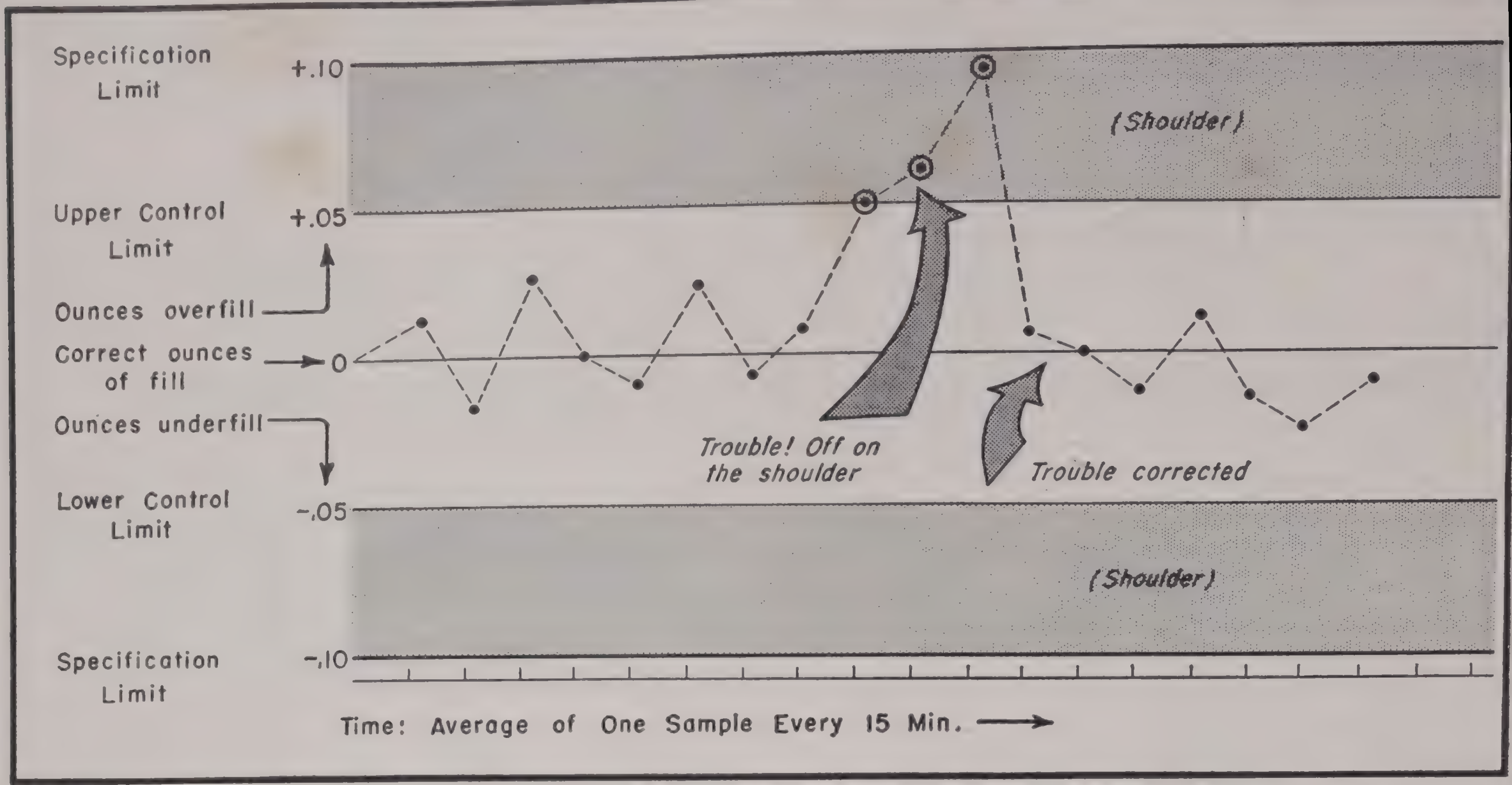
The packers already are lined up for the "kill," and the others are potential targets for the anti-big-business boys. It matters little that all of these large firms are doing business on a high ethical level, are setting the pace for efficiency in their industries, are contributing a lion's share to progress in their fields, are performing important services for American consumers and farmers—and are doing it all for a small percentage of profit. Neither does it matter, apparently, that if such leaders in industry are broken up, their contributions through research and development will be reduced and their overall efficiency impaired.

That is the bigger picture which makes the A&P case so significant. If the government were to stop with A&P alone, the damage would be limited, even though unjustified. The divisions into which the company were broken undoubtedly would continue to operate.

But the "trustbusters" may have made a mistake, too, in attacking A&P early in its campaign against big food businesses. The reaction of the millions who appreciate A&P's prices, its nice stores and the dependable quality of its products may backfire in Washington's face. At least the food industry should hope so.

—**F. K. LAWLER**, *Editor*

"When You Get to the 'Shoulder,' It's Time to Straighten Out"

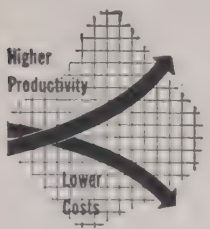


**LIKE ONE-WAY HIGHWAY,** control chart keeps your operation in line. Application here is on filling job. Note how this sampling showed over-fills, then indicated satisfactory correction after remedial measures were taken.

# Let SQC* Cut Your Costs

*Statistical Quality Control—precision technic that averts production guesswork, also is applicable in research, time-motion, inventory, personnel, and payroll operations

**FRANK KENNEY**
Chief Chemist, Quality Control Laboratory, White Rock Corporation, Brooklyn, N. Y.



Food Processors can effect notable reductions in their operating costs by applying *Statistical* Quality Control. And better quality goods will result into the bargain.

Basically, statistical quality control is a very versatile industrial tool for use by management. Its ready applicability is borne out by the fact that there is no need for a specialist's knowledge in using it successfully.

In the simplest and most common of its several forms, SQC employs charts on which, hour by hour and day by day, progress—or decline—of quality is pictured in working perspective. Closely allied in the chart technic is a scientific system of sampling.

### Cases in Point

The quickest way through the SQC door is to forget all those apprehensions about the word "statistical." It really isn't as complicated as it sounds.

There is the case of one of New England's leading dairy producers. This company's executives finally turned their attention to SQC, and they were not long in noting that it called for "different thinking." Nevertheless, a trial was launched—and its success speedily led to installation of the program, with subsequent high endorsement.

The initial work with the plan uncovered a multitude of "bugs" in the dairy's operation—many of them not even dreamed of. Machine operations were particularly spotlighted, and they have now been profitably improved through process changes, plus, in some cases, new machine design.

Interestingly enough, so hidden and unsuspected were some of these conditions that no detailed dollar cost had ever been established. Consequently, after the changes were made, no exact quantitative dollar savings could be measured. However, the fact of considerable savings for the company was obvious.

Similar striking experiences were the result of the application of simple statistical quality control to weight problems in one of the country's largest food corporations. SQC immediately showed the extent of inconsistent quality which, up to that time, had only been suspected. In addition, there was discovered considerable waste, both in machine and manpower categories. The company had been wholly unaware of these conditions.

### Million Dollar Muddle

Still another concern—an important container maker—suffered a situation where approximately $1,000,000 could have been saved by using SQC. Here, an application involving sampling and control charts would have uncovered a container's quality irregularities which ultimately resulted in spoilage of the product packed in it. Also spoiled was much valuable consumer goodwill built up by the firms using the containers.

It is seen that the new technic is capable of disclosing many pointed facts beyond conventional performance. Thus, recording of, say, Brix variations in a finished carbonated drink, might reveal more than failure to meet the tandards—it might also show that the achine responsible was *incapable* of aintaining the hoped-for standards of ormal operations.

### Careful Procedure vs. Guessing

The key, and value, of SQC lie in the act that data is obtained, and used, vith a planned, carefully calculated procedure designed to avoid all wasteful guessing. In the form considered here, there are two fundamental concepts:

1. *Significant sampling.* In collecting data about an aspect of your operation, it stands to reason that the more your data, the more accurately you can control the specific operation. But oversampling is wasteful. And haphazard sampling yields haphazard results. However, a statistical analysis will indicate that you can sample a relatively small portion of the total units involved and get the meaningful answers.

2. *Use of a pattern of measurement distribution* (on a chart) for interpretation. This ties in with the significant sampling above. After you have obtained the samples representing your total, and after you have made the necessary inspection, your data are transferred to a chart from which you can determine at a glance whether production conforms to the specifications range you have set.

Some may say: "While we don't go through all the formalities, that's pretty much what we do now." But generally, that is a fallacy. Frankly, guesses play too big a role in the conventional methods, and there is a high factor of human error. SQC is not like that. It incorporates procedures by which control is kept accurate and does not depend on experience or memory. It keeps operations regular.

Of course, full information on the "how" of SQC is outside our scope here, but the pertinent details can readily be obtained from the many publications dealing with the subject. A list of suggested reading, for those interested, is offered at the close of this article. They will be found quite helpful.

It is to be specially noted that control of quality of goods produced is by no means the only application of SQC. Its further versatility is evident when one considers that it has been successfully employed in tracing lags in production of employees, and also errors in shipments, as well as proving valuable in selection and promotion of personnel, control of stock room inventories, and in time and motion work, and control of payrolls. In addition, there is its application in research, of which more will be said later in the article.

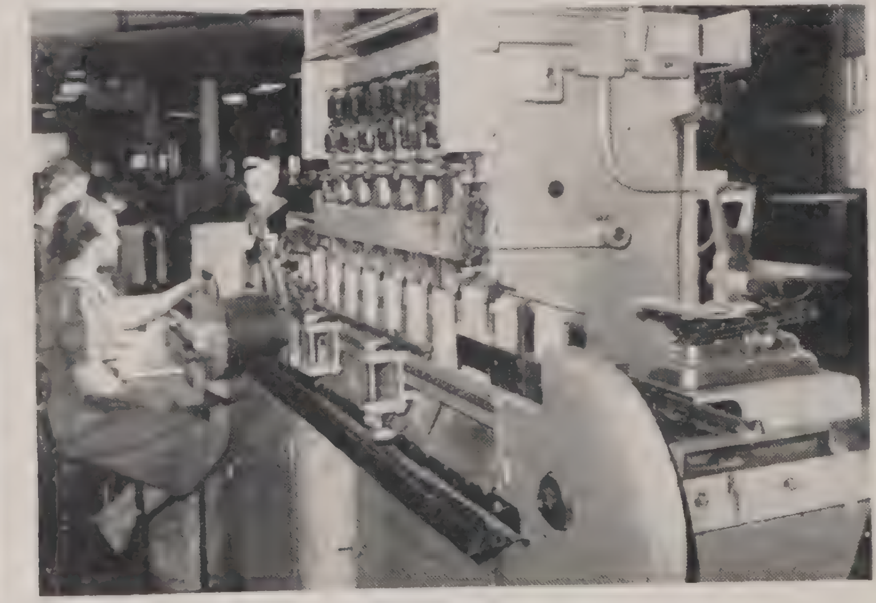
### Charting Your Performance

Now, about the chart heading this article: It illustrates the control technic. Briefly, the background of this technic is: No two units of any production can be made exactly alike. Most measurements on such units fall in a

## SQC Is Versatile

**It is effective from "raw" . . .**

Cocoa beans arrive at processing plant. Company using SQC is assured that its lots meet exacting standards.



**. . . to "finished"**

High-speed filling of chocolate product. Uniformity rose, costs fell, when control technic replaced human judgment.

**And on either batch . . .**

Chocolate melanger in action. SQC charts give revealing picture of batch cycles. Hidden costs are uncovered.

**. . . or continuous operations**

Syruping unit in a bottling plant. Variations, such as in Brix of finished drink, are quickly spotted by SQC.

group around an average. The limits of this group may quickly be calculated, and these conditions form the guide lines. Deviation from these limits shows off-quality. Even if the only value derived from these guide lines lay in the precise definition of the quality of product put out, the tool would pay for itself.

### Chart Like Auto Road

Visualize a highway with one-way traffic. The middle is considered safe, but when you get to the shoulder, it's time to straighten out. And if you actually go onto the shoulder, you are in trouble.

The control chart operates the same way. Here, the extreme outer edges of the shoulders are indicated as plant standards or specifications. The inner edges of the shoulders, or warning lines, are represented as upper and lower control limits. These are determined from measurements of actual production when the machine is set to produce material of a certain specification. That is, the machine or process writes its own limits.

In short, variations within these limits are normal, while points outside mean trouble. Thus, these control limits are used to avoid guesswork in spotting trouble before it happens, and accordingly they comprise the most important feature of the chart.

Consider the problem of a filling machine operator in a continuous production operation: The machine naturally varies in fill. He is required to make the decision to change a setting or let the machine run. All this is based on his *guess* as to when normal limits of variations have been exceeded.

Since the unit is producing at the rate of about 70-80 cartons per min., his judgment must be keen and quick to correct trouble before many substandard units have gone on through. Of course, if he stops the unit needlessly to make a setting really not required, valuable production time is lost. In either case, waste is inevitable.

### Adjustments Made at Once

Here, the simple application of SQC eliminates all guesswork. Samples are taken every 15 min. And the number of ounces of fill in each container is then recorded. Any weights over or under .05 oz. of the average mean trouble. And adjustments should then be made at once. Down-time is thus averted, material is not lost to market, more uniform goods are produced, government standards are maintained, and a smoother, more efficient operation is achieved. No matter from what angle it is considered, money is saved here.

In batch process work, SQC is equally effective in guiding production to less waste. Such things as studying time cycles for charging, heating, cooling, or in time-temperature relationships, can be accomplished by the new technic quite easily.

In some cases where only batch-by-batch records are kept by SQC methods, surprising hidden costs have been revealed.

More efficient use of man, machine, and material is the aim of any process. And this can be profitably studied by these methods of "visualizing" the performances on control charts.

One common problem, in either batch or continuous production, is the pinning down of the elusive kind of trouble which suddenly appears, causes headaches and waste, and then disappears before assignable causes may be found.

Here again, control chart work has proven itself. In fact, this is one of its basic virtues. Attention is called to the trouble—indicated by samples falling outside of control lines (see chart)—as soon as it happens and in some cases before. This allows for immediate investigation when real faults exist and, consequently, wastage is held to a minimum.

### Discounts 100 Percenters

In organizations with established laboratory inspections, it is commonly felt that "we have 100 percent inspection control and we need nothing more."

This attitude has cost, and is costing, food manufacturers countless thousands of dollars. Actually, 100 percent inspection has been proven—at its best—to be only about 80 percent efficient. This can be explained on the ground of inspector fatigue or by the laws of chance.

On the other hand, SQC, with its calculated risks, has been shown many times to cost considerably less, in terms of manpower and material waste, than 100 percent inspection.

As previously mentioned, precise technics for sampling are provided by SQC. All food manufacturers sample goods for test work. But most do it inefficiently. And almost daily, decisions are made upon the basis of the resultant inadequate samples.

Take the problem of a manufacturer receiving carload lots of bottles. For his specific use, these bottles must be free from certain defects which would cause excessive breakage in processing, with subsequent shutdowns, loss of product, machine damage, wasted manpower, and other delays.

How may he economically check the car and be sure he'll get an accurate figure on the percent defective? Under SQC, means are set up which, if followed, will make correct findings inevitable.

This same question is common considering the salability of a lot finished goods suspected of being fective. Proper sampling will rev the degree of trouble and allow f correct management settlement of t problems—when SQC reveals acc rately the risk involved.

Occasionally, too much sampli poses a problem. That is, a food man facturer will take far too many sar ples in order to be sure that his jud ment of a particular lot is accurat Even with this extra effort, he w still frequently make wrong decisio and not only will goods be wasted, b the man-hours spent in sampling ar testing will also be wasted.

The government recently recognize this fact in sampling raw sugar. Pr vious accepted practice was to samp every bag arriving. With millions o bags pouring into this country, th task was tremendous. Then in 194 a statistical study was applied, an the results showed that the samplin of only one bag out of seven was suff cient to give a correct analysis.

### Use in Research

Rather broadly, we have picture only two of the many possibilities o SQC—the use of control charts an the sampling technic—while makin passing mention of other applications

SQC has, of course, also been ap plied to practical research programs By means of more elaborate statistica methods, the cost of long and tediou experiments has been halved and i many cases quartered. The same fundamental factor is operative in thi type of work as has been pictured i production control—namely, planne action based upon sound, calculate procedure.

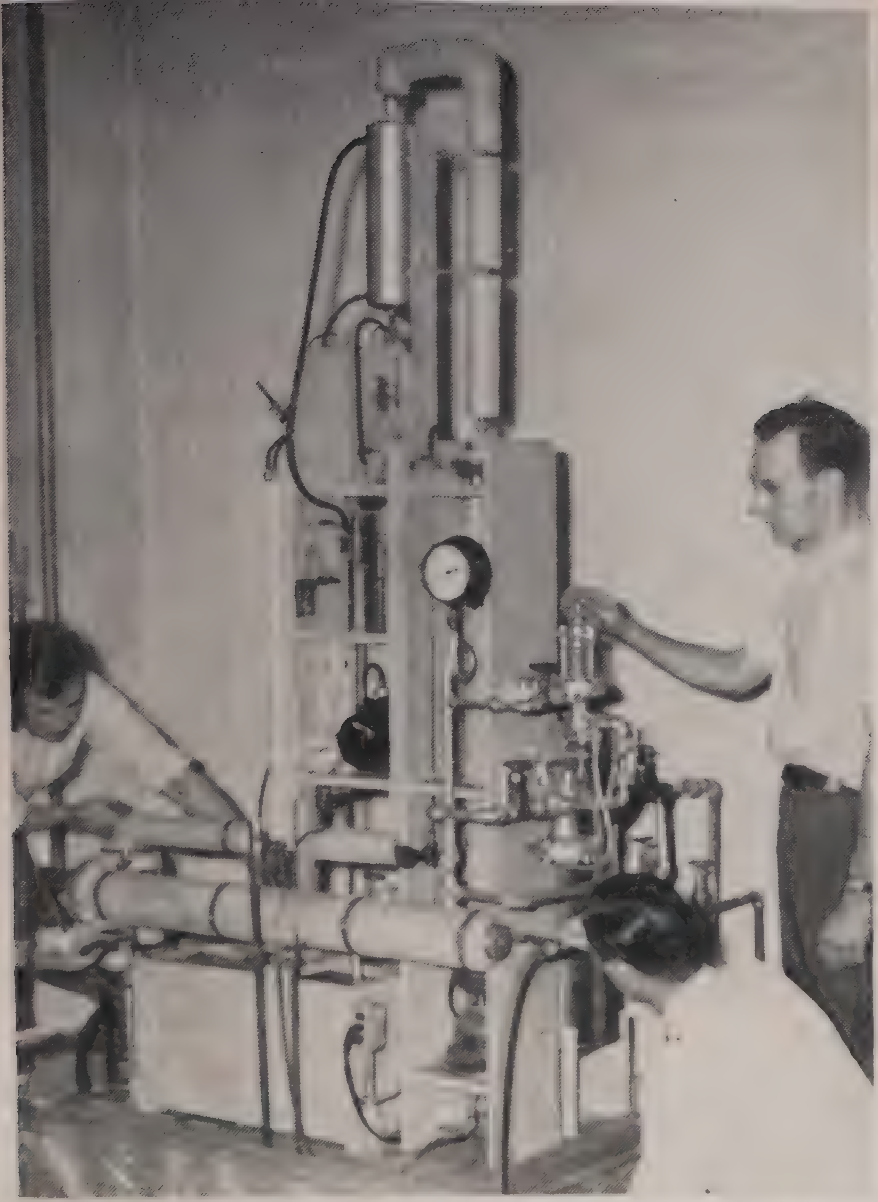
This was shown in solving an interesting doughnut problem. The manufacturer wanted to know which of several different-formula doughnut batters, each cooked in a variety of fats would absorb least of the fat used Complicating the problem, was the question of the conditions of time and temperature of cooking.

The classic approach to this problem would be to make countless numbers of runs, considering all variables individually. Time consumed could run into weeks of work and, in the end, would possibly result in a doubtful answer. By applying a statistical procedure—analysis of variance—the answer can be conclusively reached in hours instead of weeks.

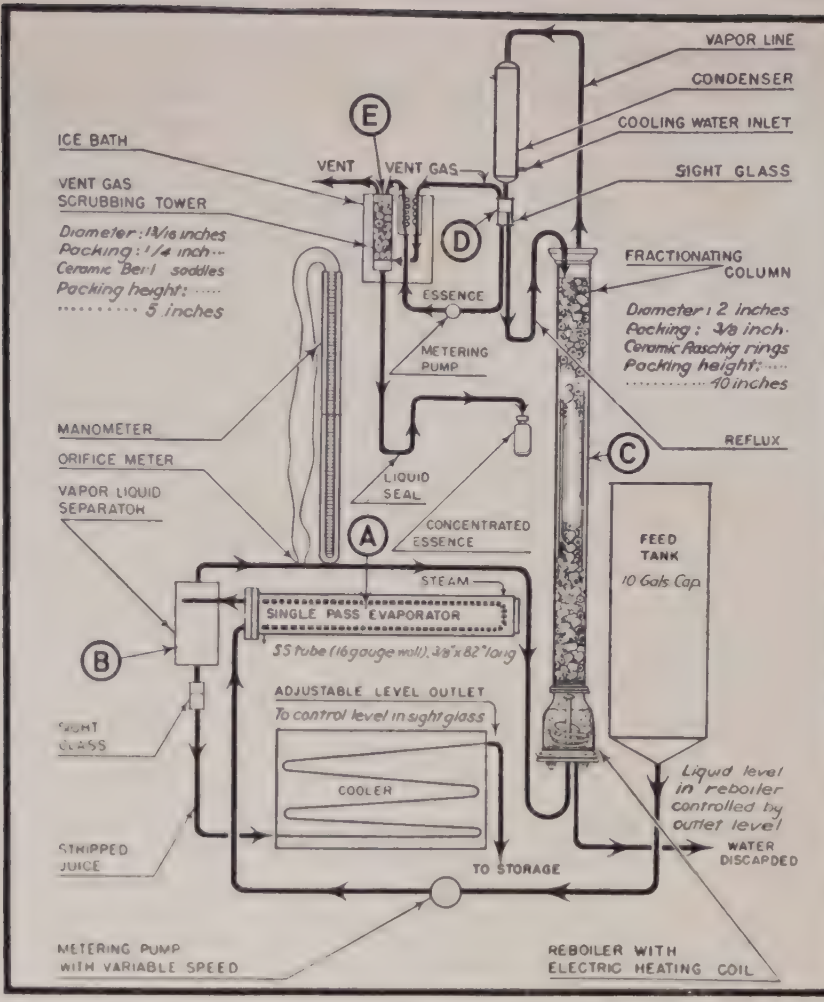
### Fancier Figuring—But Worth It

This particular procedure is concerned with a more detailed mathematical correlation and evaluation of data than would be used with control

(*Turn to page* 200)



**THIS** volatile flavor recovery unit, designed for apple juice, is now producing satisfactory essences from other fruits.


VAPOR LINE
CONDENSER
COOLING WATER INLET
SIGHT GLASS
E
ICE BATH
VENT
VENT GAS
VENT GAS SCRUBBING TOWER
Diameter: 13/16 inches
Packing: 1/4 inch Ceramic Berl saddles
Packing height: 5 inches
D
ESSENCE
METERING PUMP
FRACTIONATING COLUMN
Diameter: 2 inches
Packing: 3/8 inch Ceramic Raschig rings
Packing height: 40 inches
MANOMETER
ORIFICE METER
VAPOR LIQUID SEPARATOR
LIQUID SEAL
REFLUX
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A
CONCENTRATED ESSENCE
FEED TANK
10 Gals Cap
STEAM
SINGLE PASS EVAPORATOR
SS tube (16 gauge wall), 3/8" x 82" long
B
ADJUSTABLE LEVEL OUTLET
To control level in sight glass
SIGHT GLASS
COOLER
Liquid level in reboiler controlled by outlet level
STRIPPED JUICE
TO STORAGE
WATER DISCARDED
METERING PUMP WITH VARIABLE SPEED
REBOILER WITH ELECTRIC HEATING COIL

**HOW** flavor recovery unit works: Juice from 10-gal. feed tank is pumped through steam-heated evaporator (A), temperature of which is controlled to produce desired fraction of vapor, then goes to vapor-liquid separator (B). From here, vapor passes to fractionation column (C), where it is concentrated, then passes through water-cooled condenser. Gas, not condensed here, is chilled in an ice bath and stripped by concentrate in scrubber (E).

# New Progress In Fruit Flavor Recovery

Many volatile fresh fruit flavors—lost in previous processes—now are preserved by using unit that solved apple problem

**EDWARD L. GRIFFIN, Jr., LYLE L. DAVIS, NELSON H. EISENHARDT and MARGARET E. HELLER**

Associated with Eastern Regional Research Laboratory, Philadelphia 18, with exception of Author Davis, who is with Virginia Agricultural Experiment Station, Blacksburg, Va.

Today, new capabilities are being demonstrated by a specially developed fruit-essence recovery process for supplying concentrated volatile flavors suitable for use in fruit jellies and candies.

Using a portable flavor recovery unit, this process had already performed notably in capturing the volatile, fragrant constituents of apple juice in concentrated form[1]. Then recently it was applied to other fruit juices—grape, strawberry, blackberry, youngberry, huckleberry, peach and rhubarb. And evaluation of these new essences invites exploration of possibilities for commercial employment of the method.

However, efficiency of the process, also the evaporation required, vary with the juice. With the equipment used, evaporations of 15 to 20 percent were, in general, found to give the best results.

Profitable operation of the process will require use of the stripped juices and possibly the pressed fruit—for value of the essence cannot be expected to carry the total cost of the raw fruit unless it is prepared from waste products. Stripped juices of apples and grapes can be concentrated under vacuum to produce concentrates, which are already accepted as commercial products.

The work reported here was done at the Virginia Agricultural Experiment Station, Blacksburg, Va., in cooperation with the Eastern Regional Research Laboratory. Used was a small—10 gal. per hr.—portable essence recovery unit, designed and built by the ERRL[2].

Juices were prepared from frozen fruits collected during 1946 and 1947. The frozen materials were removed from storage and thawed overnight in their containers. To avoid altering the flavor, the fruits were not heated before pressing, but the freezing and thawing no doubt disrupted the cells to some extent.

The thawed material was pressed through a heavy grade of muslin in a hand-operated cider press and screened

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[1] Milleville, H. P. and Eskew, R. K. "Recovery and Utilization of Natural Apple Flavors," USDA, Bureau of Agr. and Ind. Chem. AIC-63 (Eastern Regional Research Laboratory) 1944, with Supplement 1; April, 1945.

[2] Milleville, H. P. and Eskew, R. K. "Recovery of Volatile Apple Flavor in Essence Form," *Western Canner and Packer*, Vol. 36, 51-4, October, 1946.

Office of the Director,
itute of Fruit Technology

to remove coarse particles of the fruit.

Raw materials used in the experiments were:

*Grapes:* Moore's Early, Niagara, Delaware and Worden. Grown at the Virginia Agr. Expt. Sta. in 1947, washed and stemmed. Skins and pulp were separated, frozen and stored at 0 F.

*Strawberries:* Blakemore, with caps. Grown at Virginia Truck Expt. Sta., Norfolk, in 1947; rejected by freezer plant because of excessive rot, probably *Botrytis*. They were frozen in 50-lb. tins and stored at 0 F.

*Strawberries:* Blakemore, with caps removed. Discards from the Chickamauga Cooperative Frozen Food Plant, Dayton, Tenn. Berries were washed, capped by machine, and sorted on an inspection belt. Discards were frozen in 50-lb. tins, and stored at 0 F.

*Peaches:* Elberta. From the 1947 pack delivered to Crozet Cold Storage Corp., Crozet, Va. They were lye peeled, washed, neutralized, inspected, and sliced. Sugar with ascorbic acid was added to make a commercial 4-to-1 pack; they were frozen, and stored at 0 F.

*Blackberries:* Wild. Harvested in Grainger County, Tenn., in 1946, and delivered to the Winter Gardens Frozen Food Corp., Knoxville. They were frozen without washing in 50-lb. tins, and stored at 0 F.

*Youngberries:* Grown near Dayton, Tenn., in 1946, and delivered to TVA Experimental Frozen Food Barge near Spring City. They were washed, sorted, frozen individually in glycerine, packed in 2-lb. cellophane bags overwrapped with single waxed boxes, and stored at 0 F.

*Huckleberries:* Wild. Harvested near Jamestown, Tenn., in 1946, and delivered to the Winter Gardens Frozen Food Corp. They were frozen without washing or stem removal in 50-lb. tins, and stored at 0 F.

*Rhubarb:* Victoria. Grown at Blacksburg in 1947. It was washed, cut into ¾ to 1½-in pieces, frozen in 50-lb. tins, and stored at 0 F.

Grape skins and pulp were pressed separately, and their juices combined for processing, except those from Moore's Early, which were processed separately. In each case, juice from the skins had a good flavor, characteristic of the grape used. That from th pulp was bitter and lacked a goo grape character.

Peaches were pressed again, afte admixture of the pulp with water equa to 98 percent by weight of the ex pressed juice. Table I shows percen extraction, pH value, and degrees Bri of the juices.

### Apple Essence Equipment Employed

The unit used in the experiments was designed to produce 150-fold apple essence from 10 gal. of apple juice per hour (see flow diagram). In the standard process for apple juice, 10 percent of the juice is evaporated in less than 20 sec. in evaporator (A). It is separated from the liquid at (B) and

## Detailed Studies Give Well-Rounded Checkup On End-Products

TABLE I—RECOVERY of Essences From Fruit Juices

| Fruit | Variety | Lot | Juice Brix Deg. | Juice pH | Extraction Percent | Evaporation Percent | Theoretical Conc. of Essence Fold | Aroma in Bottoms[1] |
|---|---|---|---|---|---|---|---|---|
| Grape | Worden | | 11.2 | 3.23 | 71.2 | 18.2 | 108 | Slight |
| Grape | Niagara | | 13.4 | 3.35 | 73.0 | 18.2 | 112 | Slight |
| Grape | Delaware | | 18.0 | 3.40 | 76.2 | 18.2 | 112 | Slight |
| Grape | Moore's Early | Skins | 12.2 | 3.45 | 88.1[2] | 18.2 | 101 | Slight |
| Grape | Moore's Early | Pulp | 12.0 | 3.15 | 42.4[2] | 18.2 | 105 | Slight |
| Strawberry | Blakemore | No caps | 9 | 3.73 | 72.2 | 18.2 | 108 | Slight |
| Strawberry | Blakemore | With caps | 5.8 | 3.70 | 83.0 | 20.0 | 89 | Slight |
| Peaches | Elberta | 1st pressing | 24 | 4.05 | 44.6 | 18.2 | 100 | Very slight |
| Peaches | Elberta | 2nd pressing[3] | 13.2 | 4.10 | 42.3 | 18.2 | 99 | None |
| Huckleberry | Wild | | 18 | 3.60 | 67.2 | 18.2 | 96 | None |
| Blackberry | Wild | | 8.9 | 3.62 | 68.9 | 20.0 | 90 | None |
| Youngberry | | | 12.0 | 3.30 | 65.6 | 18.2 | 104 | None |
| Rhubarb | Victoria | | 4.2 | 3.38 | 89.5 | 18.2 | 112 | None |

[1] Water discarded from base of fractionation column.

[2] Over-all extraction of Moore's Early Grapes was 67 percent.

[3] Water added to first pressing equal to 98 percent of juice from first pressing.

TABLE II—STRIPPED JUICES Lacked Fresh Flavor, But Reconstituted[1] Ones Were Similar to Fresh Juices

| Fruit | Variety | Stripped Juice[2] | Reconstituted Juice[3] as Compared With Fresh Juice |
|---|---|---|---|
| Grape | Worden | Very little aroma | Very little aroma |
| Grape | Niagara | Very little aroma | Sl. better flavor |
| Grape | Delaware | Sl.[4] heavy aroma | Blander, sl. cooked aroma |
| Grape | Moore's Early (skins) | Sl. heavy aroma | Sl. heavy aroma |
| Grape | Moore's Early (pulp) | Sl. heavy aroma | Sl. sweeter |
| Strawberry | Blakemore | Preservelike aroma | Sl. weaker aroma |
| Peaches | Elberta | Sl. preserve aroma | Sl. " canned " peach flavor |
| Huckleberry | Wild | Sl. preserve flavor | Sl. blander |
| Blackberry | Wild | Sl. preserve flavor | Sl. preserve flavor |
| Youngberry | | Little aroma | Sl. weaker aroma |
| Rhubarb | Victoria | Cooked aroma | Sl. less fresh |

[1] Mixture of stripped juice, essence and water in same proportion as in fresh juice.

[2] All stripped juices lacked fresh flavor.

[3] All reconstituted juices were similar to the fresh juices. Slight differences are listed here.

[4] Slightly.

TABLE III — FLAVOR CONCENTRATES Were Evaluated to Distinguish Between Fractions

| Fruit | Quality: Top Note | Quality: Undertone | Strength |
|---|---|---|---|
| Strawberry, Blakemore | Excellent | Fair | Good |
| Peaches, Elberta | Good | Good | Good |
| Huckleberry, wild | Good | Good | Good |
| Rhubarb, Victoria | Good | Good | Good |
| Blackberry, wild | Fair | Poor | Fair |
| Youngberry | Good | Fair | Fair |
| Grape, Worden | Excellent | Fair | Good |
| Grape, Niagara | Excellent | Fair | Good |
| Grape, Delaware | Fair | Poor | Fair |
| Grape, Moore's Early | Excellent | Fair | Good |

TABLE IV—JELLIES, Prepared With Stripped Juices and Various Quantities of Essence[1], Were Scored Organoleptically

| Concentration of Essence, Fold[2] | 0 | | 0.3 | | 0.6 | | 0.9 | |
|---|---|---|---|---|---|---|---|---|
| Storage, Time, Months[3] | 3 | 6 | 3 | 6 | 3 | 6 | 3 | 6 |
| Grape, Worden | 7.3 | 8.0 | 8.8 | 8.7 | 9.6 | 8.5 | 8.1 | 8.6 |
| Grape, Niagara | 7.8 | 7.5 | 8.6 | 8.9 | 9.1 | 9.0 | 8.3 | 8.4 |
| Grape, Delaware | 8.1 | 8.4 | 8.6 | 9.0 | 9.1 | 8.5 | 8.0 | 8.0 |
| Grape, Moore's Early | 8.0 | 8.4 | 9.2 | 8.6 | 9.0 | 8.5 | 7.7 | 8.3 |
| Strawberry | 8.1 | 8.0 | 8.8 | 9.0 | 8.5 | 8.8 | 8.5 | 8.1 |
| Huckleberry | 7.8 | 8.1 | 8.5 | 9.0 | 9.0 | 8.6 | 8.6 | 8.1 |
| Blackberry | 8.1 | 8.3 | 8.0 | 9.0 | 10.0 | 8.8 | 7.6 | 7.7 |
| Youngberry | 7.8 | 7.9 | 8.6 | 8.2 | 9.5 | 9.1 | 8.0 | 8.6 |
| Rhubarb | 8.3 | 8.0 | 8.3 | 8.6 | 9.1 | 9.0 | 8.1 | 8.1 |
| Rhubarb — blackberry[4] | 8.1 | 8.0 | 9.5 | 8.7 | 8.8 | 9.0 | 7.5 | 8.1 |

[1] Rated on a scale of 7 to 10 by a panel at Blacksburg, Va.

[2] Fold of essence in jelly is its concentration relative to its concentration in original juice by weight. An approximate figure only, this varies slightly from jelly to jelly.

[3] Stored at room temperature.

[4] Prepared from stripped rhubarb juice and blackberry essence.

TABLE V—FLAVORS of Strawberry and Youngberry Were Preferred Among Various Candies and Jellies Prepared With Fruit Essence[1]

| Essence | Candy Score[2] | Jelly Score[3] |
|---|---|---|
| Strawberry | 7.6 | 8.3 |
| Youngberry | 7.4 | 8.3 |
| Grape, Moore's Early | 6.9 | 7.8 |
| Grape, Worden | 6.8 | 7.7 |
| Grape, Niagara | 6.6 | 7.7 |
| Huckleberry | 6.6 | 6.7 |
| Peach | 6.2 | 7.5 |
| Blackberry | 6.0 | 7.0 |
| Grape, Delaware | 5.7 | — |
| Rhubarb | 5.2 | 6.1 |

[1] Scored on a scale of 1-to-10 by a panel of 25 at Philadelphia.

[2] Pectin gum candy, 2-fold essence added.

[3] Jelly containing 65 percent sugar, 1-fold essence added.

concentrated in fractionation column (C).

The fraction evaporated is measured by a manometer, across an orifice in the vapor line. Rate of evaporaton is controlled by adjusting the steam pressure on the evaporator. The noncondensable vent gas is chilled in an ice bath and stripped by passing it counter-currently with the chilled product in scrubber (E). Volumetric concentration of the product is controlled by the rate it is pumped from chamber (D) to the scrubber. Thus, if one part of the product is pumped off for every 100 parts of juice run to the evaporator, the resultant essence contains all the aroma recovered from 100 parts of fresh juice and has a 100-fold volumetric concentration.

The fractionation column has a maximum vapor capacity of about 1.5 gal. of water evaporated per hour. For this reason, when 20 or 30 percent fractions are evaporated, the feed rate is reduced from 10 gal. to 5 or 3⅓ gal. per hr., respectively, so that the volume of vapor to the fractionation column remains constant (1 gal. per hr. evaporated in each case). Since the unit was not designed for these conditions, it will not necessarily give optimum performance under them. In order to get the minimum heat damage, the evaporation should be designed for the conditions used.

### Experimental Procedure

The general procedure was first to determine approximately the evaporation required to recover the most desirable essence, and then, using this evaporation, to produce essences of about 100-fold volumetric concentration. Approximately 10, 20 and 30 percent fractions were evaporated, and condensed without concentration. These fractions were diluted with water to a volume equal to that of the fresh juice from which they were produced.

Diluted fractions and their respective stripped juices were compared by sense of smell with the fresh juices to determine completeness of stripping off of aroma, possible alterations in character, and relative strength and quality. In all cases tested, the stripped juice after 10 percent evaporation had a slightly fresher flavor than the stripped juices after 20 or 30 percent evaporation, which had about the same strength.

There seemed to be a heat-developed aroma in some of the stripped juices after 30 percent evaporation. This might have been caused by the low feed rate used. With rhubarb juice, a slight "cooked" flavor developed at 20 percent evaporation. Based on these results, 18 to 20 percent evaporation was used for all essences produced. This variation was unintentional, resulting from a difference in calibration of the feed pump rate.

Because of the small quantities of huckleberries, peaches, Delaware grapes, and Moore's Early grapes available, it was not possible to determine their optimum evaporation percentages. Table I gives the theoretical concentration of the volatile flavor and a qualitative statement of the aroma of the water discarded from the bottom of the fractionation column. All essences were water white.

Maximum concentration of volatile flavors obtainable was not studied.

Serious fouling of the evaporator tube or foaming in the separator was not encountered with any juice.

Three separate series of organoleptic tests to evaluate the flavor concentrates were made by different groups of people. Different methods of preparation and scoring were used in these tests. Comparison of ratings is valid, therefore, only within the same series. The first of these tests, made at the time of processing, attempted to determine the efficiency of recovery of the flavor from each juice. A second series, carried out later at Blacksburg, compared jellies prepared from stripped juices with various amounts of added essence. The third series, made at Philadelphia, compared for general acceptance standard pectin candies and jellies prepared with the various essences (see Table V).

> ■ **"Particular importance attaches to the accomplishments recounted here—because for the past 25 years the goal of researchers has been capture of the aroma of fresh fruits or their juices without changing the ingredients or their relationship to one another. Yesterday, the goal was reached for apples. And now today other fruits are falling into line."**

All essences and stripped juices were evaluated organoleptically for quality and strength of flavor. Each essence was diluted with water to the same concentration as that in the original juice. It was also diluted with stripped juice and sufficient water to reproduce the proportions of the original juice. These samples were then compared with the original juice. Characteristics of the stripped and reconstituted juices are summarized in Table II. The degree to which the aroma of the diluted essence and the flavor of the reconstituted juice approached that of the fresh juice in quality and strength was taken as a measure of the efficiency of the process.

The more fragrant and lighter fractions of the aroma were more volatile and far more readily recovered than the heavier and more pungent undertones. This led to some distortion of the balance between these factors in the flavor concentrates produced. Table III summarizes the evaluation of the flavor concentrates, attempting to distinguish between recovery of the lighter fraction or "top note" and the heavier "undertones" as well as strengths. When these values approximated full recovery of the aroma from the juice, an excellent rating was given, because an essence cannot be expected to be any better than the juice from which it was recovered.

### "Top Note" Fractions Easily Recovered

Grape essences contained the top fragrance of the grapes but were lacking in the heavier undertones of aroma. Essences from the Worden, Niagara and Moore's Early grapes were characteristic of the individual varieties, but essence from the Delaware grapes was of poorer quality.

Strawberry essences were slightly weaker than their theoretical concentration and lighter in character than the aroma of the fresh juice. Strawberry essence is apparently composed largely of the "top note" of the fresh strawberry aroma, which is normally lost in processing. Although the strawberries used were discards from commercial processing, the essences were surprisingly good; the essence from the lower-grade rejected berries with caps was only a little poorer than that from the discards without caps.

Peach essence produced from first press juice had a strong fresh peach aroma with an almond-like character typical of the pits. Curiously enough, an essence produced from the juice of the second pressing was very similar in strength as well as in character to that from the first pressing.

Huckleberry essence had a characteristic huckleberry aroma of good strength but of a slightly lighter character than that of the fresh juice.

Blackberry essence, in the concentrated form, was recognizable as blackberry but was lacking in the heavier portion of the aroma. When diluted to juice strength, it was weak and not recognizable as blackberry.

Youngberry essence had a good fragrant aroma, but when diluted with water to its strength in juice the aroma was less pronounced and the mixture had a slightly different character.

Rhubarb essence had a sharp characteristic aroma but was slightly different in character from that of the fresh juice, probably due to development of a cooked flavor.

Jellies were prepared from the stripped juices by adding sugar to 65 percent, bringing to a boil, adding commercial apple pectin, pouring into 250-ml. beakers, cooling to 170 F.,

(*Turn to page* 196)

**With aid of model, posters and sketches, leader presents project to . . .**

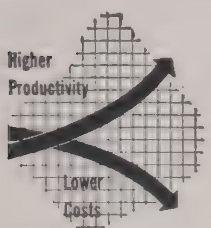
**EACH MEMBER** takes charge (as shown above) of one monthly meeting a year. Job is to arrange entire project.

# How To Make Work Simplification Work

Secret is persistent attack—punctuated with "follow-throughs" and implemented with personnel tests, task recordings, and performance charts and forms

**HAROLD G. DUNLAP**

Work Simplification Director, H. P. Hood & Sons, Boston, Mass.



Work simplification has paid dividends at H. P. Hood & Sons, Boston—by increasing output, cutting costs, bettering product quality and improving employee relations all along the line.

But—we hasten to say that these dividends didn't "just happen." To win them, it was necessary to draft a practical project, to get it off on the right foot, and to "follow-through." We will explain here how all this was done.

First off, our early experience with work simplification brought us to recognize two distinct ways of applying it.

A processor can, if he wishes, employ what may be called the "experting approach." That is, hunt out, somewhere, a specialist to put the program over—someone who can go through the plant, see all the opportunities for making workers more effective, develop a workable method for bringing this about, and then actually put the plan to work.

On the other hand, there is the company approach—we mean a careful building up of the work simplification idea through the company's own personnel, to mount a cooperative attack on the problem by the whole organization.

It was this more promising method that we chose. And, naturally, it entailed a great lot of doing. First, we had to muster the necessary know-how by close study of the many questions. Highlighting this preliminary work was our personal attendance at Mogensen's* Lake Placid Work Simplification Conference.

The procedure taught by Mogensen may seem unnecessarily slow in accomplishment, but we believe that once results are obtained, they are more lasting and more cumulative in effect.

Mogensen taught—and we learned through experience—that creation of a sound program demands adherence to these four major factors—

1. The human factor must be given first consideration.
2. No individual should lose his employment due to improved methods resulting from work simplification.
3. Top management must thoroughly understand and actively participate in the program.
4. Several years are required for the development of a sound, lasting program.

### Step-by-Step Development at Hood's

The following outline will give some idea of the steps our company went through during the process of establishing its present program.

In 1941, we sent one of our plant superintendents to the Massachusetts Institute of Technology for a short course—48 hr.— in work simplification basic training.

Then, during the first several months of 1942, we experimented at this superintendent's own plant.

In July, 1942, the same superintendent attended Mr. Mogensen's Lake Placid Work Simplification Conference.

And in October of the same year, a 4-hr. appreciation session was given to the senior and junior boards of execu-

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* Allan H. Mogensen, industrial consultant, New York City. His Lake Placid, N. Y., conference is an annually-conducted industrial training project.

**. . . development group members, who pore over detail charts**

**MEETINGS** like this are held one full day each month. A representative of Work Simplification Department sits in.

tives—the officers of the company together with senior executives and their assistants.

At this stage, the plant superintendent was spending approximately one half of his time on the program.

Finally, the company launched basic work simplification training in December, 1942, mostly at the manager and superintendent levels. By average count, 70 supervisors have been trained each year since.

Early in 1944, a full time staff department was established. This did not change our policy, but intensified the tempo of the program. Accordingly, training was expanded into other departments and divisions of the company, and we have now trained 493 representatives from all divisions.

### Importance of Follow-Through

One of the missing links in many attempted programs of this kind is lack of an organized follow-through. Too often, no thought is given to this vital phase. We were fortunate in recognizing this need early in the program's development.

Our original follow-through comprised a Work Simplification Conference Group formed late in 1943. The name has since been changed to Work Simplification Development Group. This group is made up of supervisors from various departments in our different plants scattered throughout New England. They meet at the Boston headquarters for one full day each month.

Objectives of the meetings are to present problems for solution, trade ideas, and keep the members informed on latest technics in work simplification. All conferees have completed work simplification training, and are applying it in the line organization, either full or part time.

At present, the chairman and co-chairman posts rotate monthly, thus giving each member of the group approximately one chairmanship a year. The chairman and co-chairman must work out the complete program, arranging for the project and discussion leaders. The Work Simplification Department is now allotted a short period in which to bring conferees up to date on new methods and technics, and on various interesting work simplification developments in or out of the company. We record, transcribe, and maintain general supervision over the meetings.

All told, it is surprising how these men have developed, and how well they plan and conduct their meetings.

In our work simplification training and application, we make use of several tools—the peg board, movies, photographs, charts and forms.

Pictures, both movies and stills, have contributed largely to the success of the project. Our 16 mm. film library contains over 88,000 ft. showing operations in many of our plants. This is supplemented by 450 stills. In addition to improving methods, these pictures help to develop and maintain interest in the job—especially at the worker level.

Flow process charts are used to "break down" operations and form a graphic picture of the work procedures, listing in sequence each detail, no matter how minor or temporary.

Special "Lick the Problem" forms are used to locate deviations from standard methods, and to correct them.

In 1945, our junior board proposed a waste elimination program. The senior board of executives accepted the recommendation, and turned it over the Work Simplification Department to carry out.

It was at this point that the importance of demonstrating how work simplification could effect a saving in time and effort became apparent. After extensive research, we came up with a "Peg Board Demonstration" that showed the need for establishing and setting up standard methods.

### How "Peg Board" Operates

A 24-hole "peg board" and two containers are placed before the "testee," who is seated at a table designed especially for the demonstration. An adjustable screen blanks off his face, making identification impossible. Told that the set-up represents a job, he is then instructed to "do the task on his own"—to think of the simplest and easiest way

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**■ Last month, Mr. Dunlap's "Work Simplification Pays Off" gave FI readers a revealing picture story of the many striking processing improvements effected at Hood's through task-simplifying technics. Now, in this sequel, he discloses the astute steps that made the program work.**

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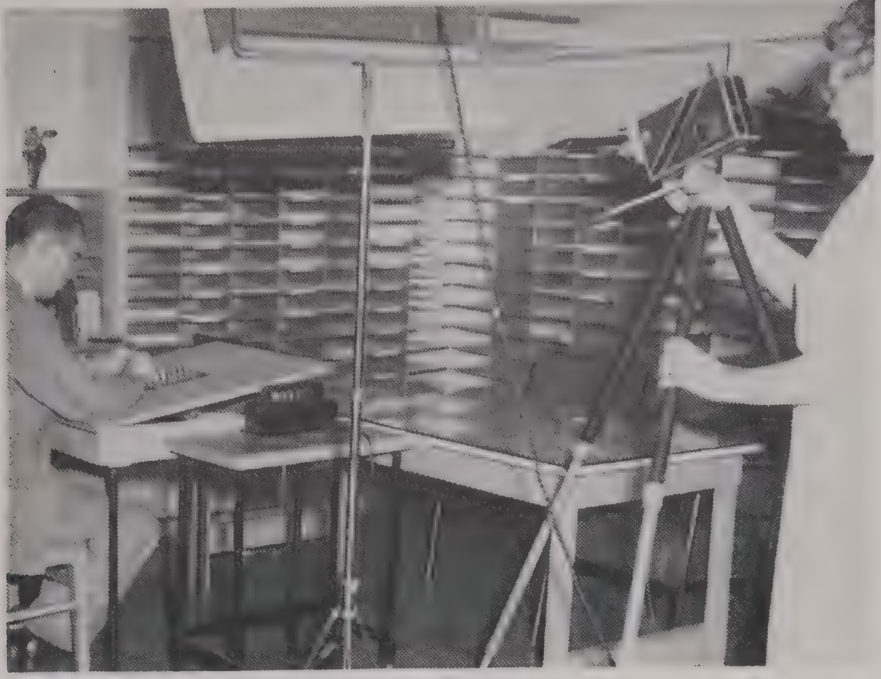
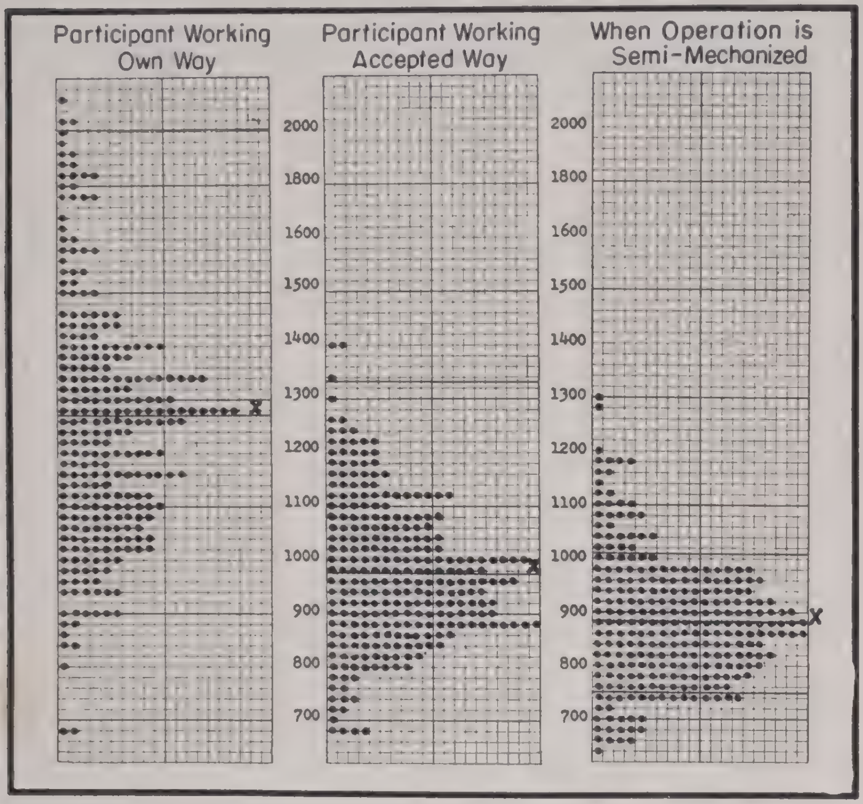
## 270 peg-board-tested employees . . .



**PARTICIPANT** places pegs in 24-hole board, then removes them as counter (center) registers time in winks (approximately 34 to second). Movie camera records movements.

## . . . prove simplification boosts output



**SCATTER CHARTS** show individual accomplishments of the testees. Note ("X" points) how averages improve—from 1250 to 900—with betterment in methods.

to insert the pegs in the holes, and then remove them and return them to their original container.

As the participant works, a movie is taken of his method. It is interesting to note that, of the 425 individuals who have participated in this demonstration, no two did the job exactly alike.

For the second stage, the instructor takes over and explains the accepted method of handling the pegs, and has the participant go through it once, with another movie taken.

The third stage consists of the same method, but here (see photo) the table top is sloped, the peg board is depressed, and a simple device has been introduced for removing the pegs. This illustrates the progress when a method is developed into a machine.

Our executive board was the first organized group to participate in this demonstration. We have found it so effective, however, that it has now been amplified and is being used in our basic training sessions.

In spite of all this activity, we still found basic trainees who said they did not "hear much new" about work simpl fication after their original training. Therefore, two yea ago, we started a one-day "refresher" for every individu who had completed basic training. It proved so successf that we have decided to incorporate an annual refresher i our program.

One of the most interesting parts of the refresher progra is a 1-hr. discussion at which each participant is calle upon to contribute original thinking on the subject of wor simplification relative to his own job. We believe many companies would be surprised at the high type of discussion and help received from these people.

### Training Extended to Operators

At several locations where basic training for supervisor had been completed, it was felt that we should carry on some sort of organized training down to employees and key personnel below supervisory level. This problem was turned over for consideration by the Work Simplification Development Group, which after several months came up with a suggested training program, consisting of three 1-hr. meetings. A line-organization representative who has had work simplification training, conducts the meetings, with assistance from the Work Simplification Department whenever necessary.

Our experience has been that better results are attained when individuals from the line organization lead the meetings. Using them to introduce work simplification below the supervisory level creates good feeling and gives the supervisor involved an excellent training in human relations. Of course, we made a provision that this training would be given only at locations where all supervisors had finished basic training.

We realize that three hours spent introducing work simplification cannot cover the entire program. But we are giving these individuals something in the way of participation so that they may realize that they are a vital part of the program. Their intelligent participation may prepare them for supervisory work later on.

During the first hour of this elementary training, we take 5 min. to explain the background of the company's program and approximately 10 min. to discuss the human relations involved, what work simplification is, and why it is important to all of us on our jobs. Then 35 min. are given to films showing operations in our plants, and finally there are 10 min. for a general discussion.

In the second hour, we demonstrate the peg-board technic, going through the first two stages but omitting the special table. We invite an individual from the group to participate, and after he works out and demonstrates his method, we show him the method that has been developed as the result of three years' study. Both methods are then discussed, and in this way the entire group is given a chance to see the value of the approach—"why we should study jobs and why we should have standard methods."

We also emphasize the need for doing away with unnecessary motions, for developing skills, for eliminating twisting, turning, and excessive reaching. In this session, 25 min. are devoted to moving pictures—films of some of our own jobs, showing different principles of motion. A 10-min. general discussion completes the second session.

### Flow Process Charts Studied

In the third 1-hr. session we take up flow process charts (see illustrations). Not that these individuals are expected to make charts, but we do want them to understand what a flow process chart is. In that way there will be no mystery or misunderstanding when an operation that they may be working on is charted. They will understand why it is being done and what we hope to accomplish by it.

We recommend developing a chart in the division or department that is putting on the program, using a simple job such as one involving transportation, lifting, or a task that can be easily improved. The chart should be as short as possible, one that is readily understandable. It should show the original method, step by step.

A good idea is to let the group members improve the chart themselves. Points of possible betterment can be brought out by asking *Why? What? Where? When? Who? and How?*

Approximately 10 min. are allotted for the discussion of the chart itself, 20 min. for films, and 10 min. for general discussion.

Excellent results have been attained with this approach, and to date 326 individuals have attended the 3-hr. course. With the program carried down to the operators, it is particularly important that a definite follow-through procedure be established. We believe that it is a mistake to teach anyone in methods of development, in work simplification, or any other type of training, and not follow through with a continuing program.

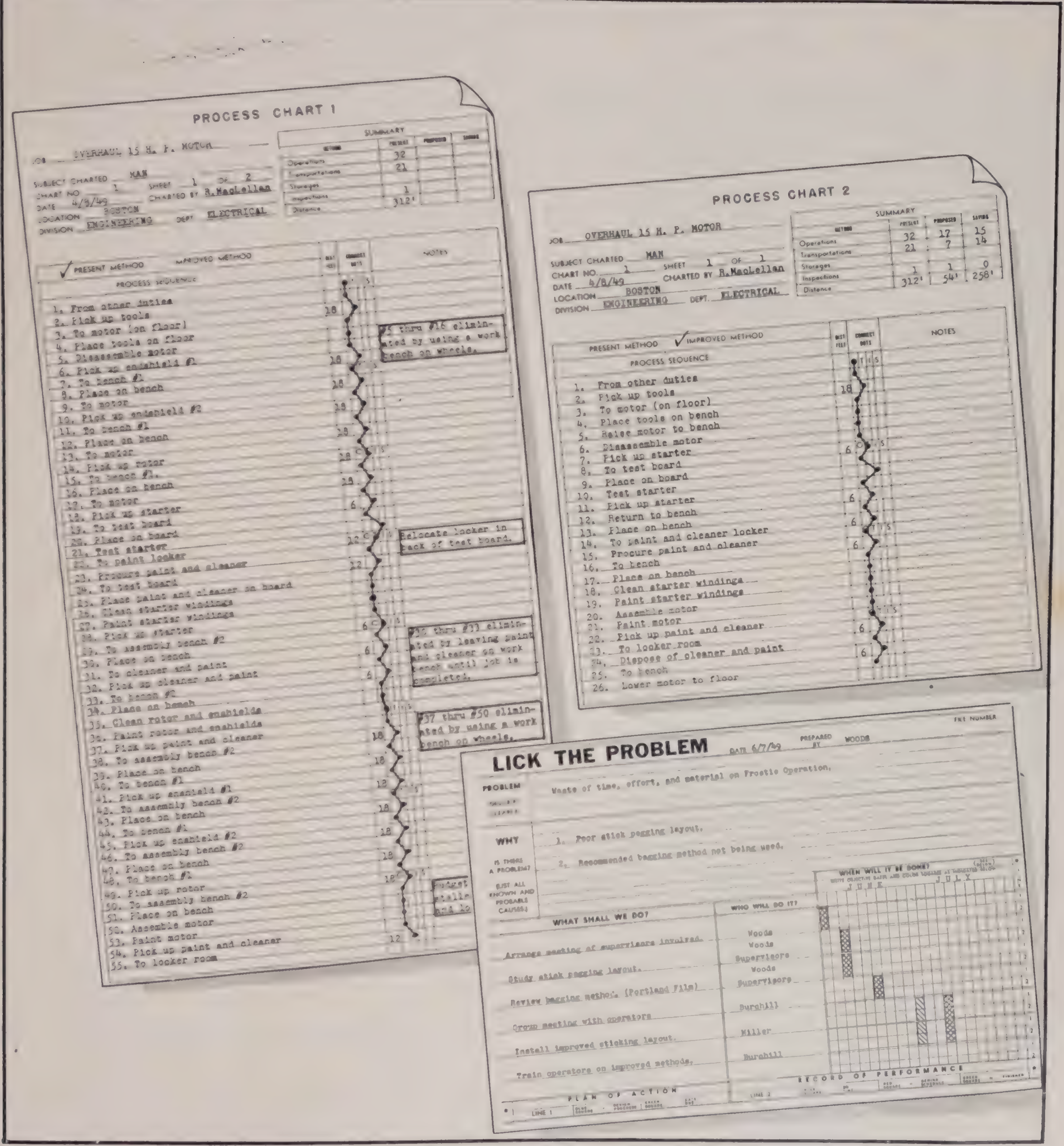
The following is a recommended follow-through outline for each division or location:

Management should discuss proposed changes with all of the employees involved, and give them an opportunity to discuss the changes and make suggestions.

Supervisors should be checked regularly to make sure they are applying work simplification on their jobs.

Employees who make suggestions should receive adequate answers as quickly as possible.

## Special Forms Play Important Roles



PROCESS CHART 1

JOB OVERHAUL 15 H. P. MOTOR
SUBJECT CHARTED MAN
CHART NO. 1 SHEET 1 OF 2
DATE 4/8/49 CHARTED BY R. MacLellan
LOCATION BOSTON
DIVISION ENGINEERING DEPT. ELECTRICAL

| SUMMARY | PRESENT | PROPOSED | SAVING |
|---|---|---|---|
| Operations | 32 | | |
| Transportations | 21 | | |
| Storages | | | |
| Inspections | 1 | | |
| Distance | 312' | | |

✓ PRESENT METHOD IMPROVED METHOD

| PROCESS SEQUENCE | DIST. FEET | NOTES |
|---|---|---|
| 1. From other duties | 18 | |
| 2. Pick up tools | | |
| 3. To motor (on floor) | | #3 thru #16 eliminated by using a work bench on wheels. |
| 4. Place tools on floor | | |
| 5. Disassemble motor | 18 | |
| 6. Pick up endshield #1 | | |
| 7. To bench #1 | 18 | |
| 8. Place on bench | | |
| 9. To motor | 18 | |
| 10. Pick up endshield #2 | | |
| 11. To bench #1 | 18 | |
| 12. Place on bench | | |
| 13. To motor | 18 | |
| 14. Pick up rotor | | |
| 15. To bench #1. | 18 | |
| 16. Place on bench | | |
| 17. To motor | 6 | |
| 18. Pick up starter | | |
| 19. To test board | | |
| 20. Place on board | 12 | Relocate locker in back of test board. |
| 21. Test starter | | |
| 22. To paint locker | 12 | |
| 23. Procure paint and cleaner | | |
| 24. To test board | | |
| 25. Place paint and cleaner on board | | |
| 26. Clean starter windings | | |
| 27. Paint starter windings | 6 | [illegible] thru #33 eliminated by leaving paint and cleaner on work bench until job is completed. |
| 28. Pick up starter | | |
| 29. To assembly bench #2 | 6 | |
| 30. Place on bench | | |
| 31. To cleaner and paint | 6 | |
| 32. Pick up cleaner and paint | | |
| 33. To bench #2 | | |
| 34. Place on bench | | |
| 35. Clean rotor and endshields | | #37 thru #50 eliminated by using a work bench on wheels. |
| 36. Paint rotor and endshields | 18 | |
| 37. Pick up paint and cleaner | | |
| 38. To assembly bench #2 | 18 | |
| 39. Place on bench | | |
| 40. To bench #1 | 12 | |
| 41. Pick up endshield #1 | | |
| 42. To assembly bench #2 | 18 | |
| 43. Place on bench | | |
| 44. To bench #1 | 18 | |
| 45. Pick up endshield #2 | | |
| 46. To assembly bench #2 | 18 | |
| 47. Place on bench | | |
| 48. To bench #1 | 18 | |
| 49. Pick up rotor | | |
| 50. To assembly bench #2 | | |
| 51. Place on bench | | |
| 52. Assemble motor | | |
| 53. Paint motor | 12 | |
| 54. Pick up paint and cleaner | | |
| 55. To locker room | | |

PROCESS CHART 2

JOB OVERHAUL 15 H. P. MOTOR
SUBJECT CHARTED MAN
CHART NO. 1 SHEET 1 OF 1
DATE 4/8/49 CHARTED BY R. MacLellan
LOCATION BOSTON
DIVISION ENGINEERING DEPT. ELECTRICAL

| SUMMARY | PRESENT | PROPOSED | SAVING |
|---|---|---|---|
| Operations | 32 | 17 | 15 |
| Transportations | 21 | 7 | 14 |
| Storages | | | |
| Inspections | 1 | 1 | 0 |
| Distance | 312' | 54' | 258' |

PRESENT METHOD ✓ IMPROVED METHOD

| PROCESS SEQUENCE | DIST. FEET | NOTES |
|---|---|---|
| 1. From other duties | 18 | |
| 2. Pick up tools | | |
| 3. To motor (on floor) | | |
| 4. Place tools on bench | | |
| 5. Raise motor to bench | | |
| 6. Disassemble motor | 6 | |
| 7. Pick up starter | | |
| 8. To test board | | |
| 9. Place on board | | |
| 10. Test starter | 6 | |
| 11. Pick up starter | | |
| 12. Return to bench | 6 | |
| 13. Place on bench | | |
| 14. To paint and cleaner locker | 6 | |
| 15. Procure paint and cleaner | | |
| 16. To bench | | |
| 17. Place on bench | | |
| 18. Clean starter windings | | |
| 19. Paint starter windings | | |
| 20. Assemble motor | | |
| 21. Paint motor | 6 | |
| 22. Pick up paint and cleaner | | |
| 23. To locker room | 6 | |
| 24. Dispose of cleaner and paint | | |
| 25. To bench | | |
| 26. Lower motor to floor | | |

LICK THE PROBLEM DATE 6/7/49 PREPARED BY WOODS FILE NUMBER

PROBLEM Waste of time, effort, and material on Frostie Operation.

WHY IS THERE A PROBLEM? (LIST ALL KNOWN AND PROBABLE CAUSES)
1. Poor stick pegging layout.
2. Recommended bagging method not being used.

| WHAT SHALL WE DO? | WHO WILL DO IT? |
|---|---|
| Arrange meeting of supervisors involved. | Woods |
| Study stick pegging layout. | Woods<br>Supervisors |
| Review bagging method. (Portland Film) | Woods<br>Supervisors |
| Group meeting with operators | Burghill |
| Install improved sticking layout. | Miller |
| Train operators on improved methods. | Burghill |

WHEN WILL IT BE DONE?
JUNE JULY

PLAN OF ACTION LINE 1
RECORD OF PERFORMANCE LINE 2

**PROCESS CHARTS** show how "operations" required to overhaul 15 hp. motor were reduced from 55 to 26 by careful study. "Lick The Problem" form helped to establish standard methods. Progress of project is recorded in colors.

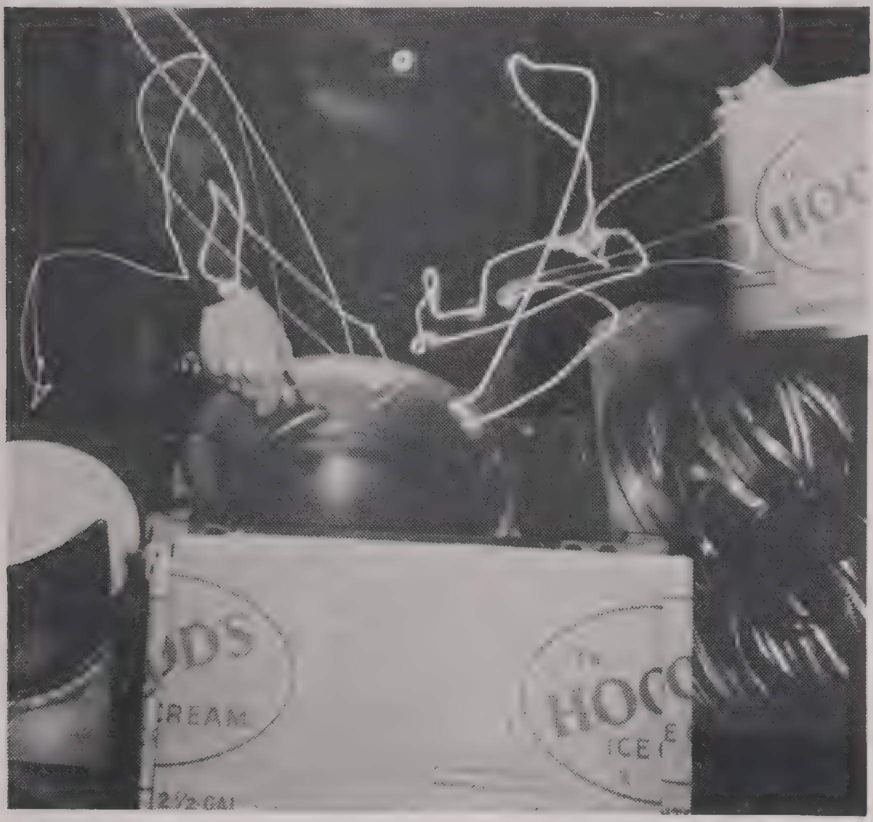
Management should adopt a program calling for regular supervisory conferences to discuss work simplification activities. It is advised that supervisors be conference leaders, using a rotating system. Excellent results have been obtained using this type of conference. It builds confidence and develops leadership.

The work simplification program should be explained to all new employees.

A short work simplification meeting should be held for all employees annually.

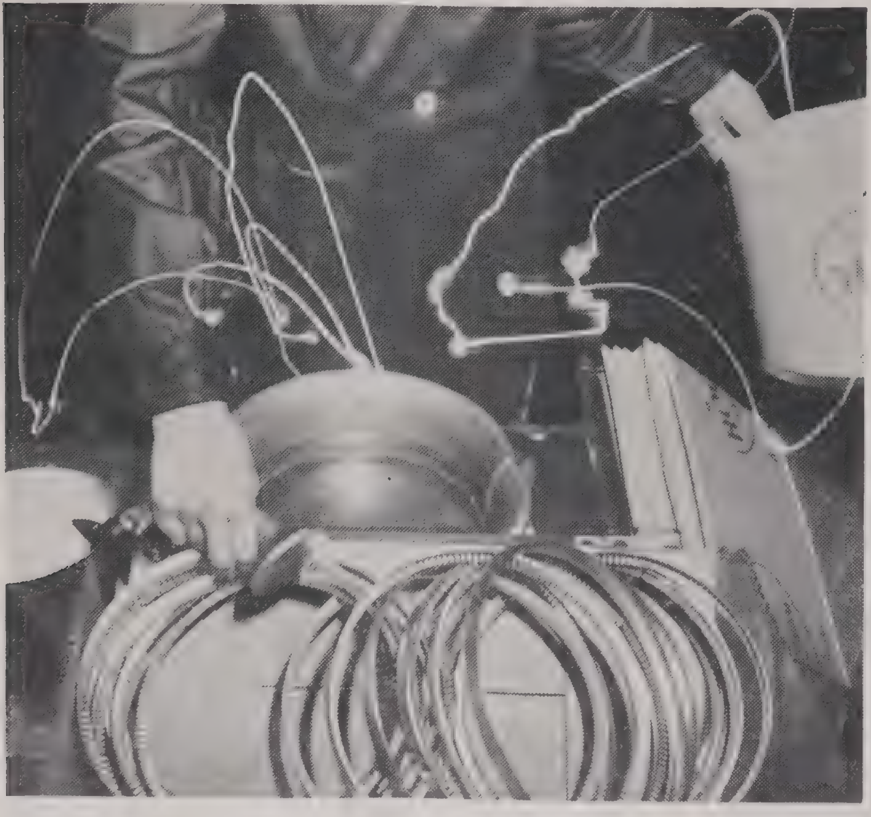
It has been accepted that the flow process chart is one of the most valuable tools in work simplification. We suggest that a competent individual be available to chart operations at the request of supervisors. For too many times there is dependence on the supervisor to chart operations—only to find that the nature of his normal activities does not give him sufficient uninterrupted time for successful charting. Hence, much time can be saved if someone is specially trained to observe the operations and to make the chart

## Cycle-Graph Spots Waste Motions



**OLD METHOD** of assembling paper ice cream cans resulted in low output (note excess of motion traces).

## And They're Omitted In New Method



**IMPROVED METHOD** reduced motions 24 percent (note simpler traces), increased production 31 percent.

Ample time should be provided for chart analysis an discussion of operations involved.

A minimum of two operations should be filmed each yea Experience has shown that this is an excellent way t create enthusiasm, and it provides a good habit pattern fo reviewing operations.

Now let us consider the regular monthly procedure t create and maintain interest in work simplification. Thi procedure should—

1. Develop a minimum of one flow process chart monthly
2. Develop a minimum of one waste elimination project. Here, we tell them that we are not necessarily looking for a $10,000 project, but rather seek any plan that will eliminate waste. It could be a $1.50 a $10.00 or $10,000 proposition.
3. Show films of other departments.
4. Employ a "Lick The Problem" form. Our experience has proved this tool to be very valuable in solving a problem through an organized procedure.
5. Include work simplification supervisory meetings. Here, we accent the "work simplification," because too often at supervisory meetings so many extraneous subjects are introduced that the opportunity to discuss work simplification is lost.

### How Problems Are Solved

Many of our locations today are handling their problems in the following way: A problem is flow process charted, an interpretive motion diagram is drawn up, and a film is taken. Sometimes, of course, a general discussion on the problem is all that is necessary. All of the supervisors involved are brought into such discussions. They may decide that more facts are necessary before bringing in the actual operators, but eventually all those involved in that operation, and with the operations allied with it, are brought in.

We repeat, it is amazing how much interest is evidenced, how many suggestions made, and how much help we get from people on the job.

As an example, we received 44 suggestions in group discussions, with most of them helpful, in the development of a job that had been worked on for several weeks by engineering, work simplification, and plant superintendents. This, notwithstanding the fact that we have a formal suggestion system which pays 25 percent of the first year's net savings up to an award of $1,000.

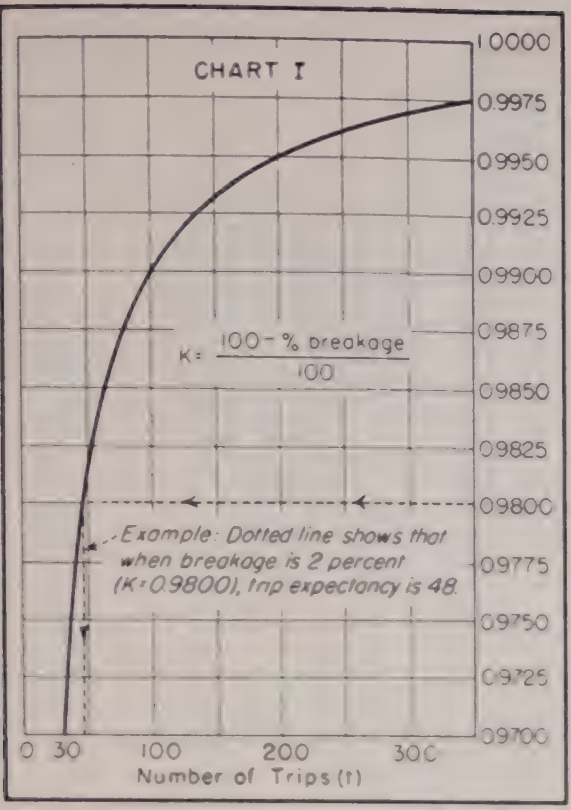
The fact that the suggestions came as the result of *group effort* seems to be readily accepted as putting the ideas outside the scope of the suggestion system. Members of a group seem interested in the fact that they have the opportunity to contribute in making the job—their job—better. And accordingly they certainly take pride in their work.

Another procedure which must not be overlooked or neglected, since it builds confidence and creates interest, is to show to the group affected, any film made of their own operations before any other group views it. We feel that the operators are entitled to see their own film first. This is recognition of those directly involved, and it encourages them to take more interest in the program and to work more closely on subsequent projects.

With the basic training held in Boston, some of our people travel as much as 500 miles for one-day meetings, four of them held in consecutive weeks. That top management is pretty well sold on the program is indicated by this payment of traveling expenses, and in some cases the cost of two extra days, to enable a man to attend four one-day meetings.

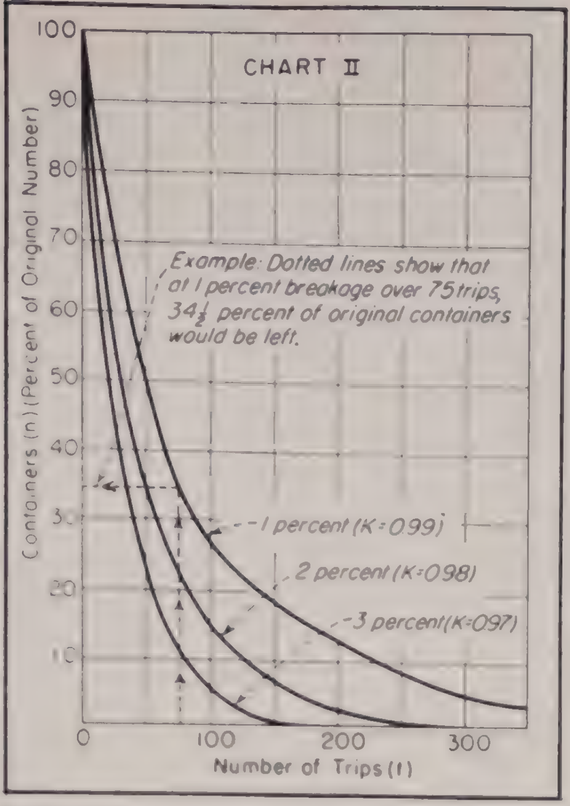
After seven years of this training, we were surprised to find that this year is our heaviest to date. Over 400 individuals are scheduled for one-day refreshers this fall and approximately 130 individuals for four day basic training.

### HOW MANY TRIPS?



**YOU** can determine average number of trips per container by applying the K value (equation above) on this chart.

### HOW MANY LEFT?



**TO FIND** number remaining after 100, or 200, trips, merely glance to left from percent-breakage line.

# Here's a Quick Way to Pin Down Returnable-Container Costs

Just apply your "breakage-denominator" and these simple charts will reveal the trip-life for bottles, barrels, cases, or cartons

**M. SIVETZ**

Chemical Engineer,
Argonne National Laboratory, Chicago, Ill.

You are sending bottles or other containers through your plant, filling them, shipping them out, and eventually having them returned to go through the same cycle. But do you know the average life of those containers? That's Question No. 1 in determining costs.

At-a-glance determination of this important factor can be made by referring to the accompanying charts. The only qualification with regard to their use is that the items (whether bottles, jars, lug boxes, cases, cartons, or drums) be numerous—at least in the tens of thousands. This requirement is made because statistical averages do not hold with great accuracy for smaller numbers, whereas when large numbers are used, production percent losses are surprisingly regular and easily analyzed.

All you need know is the percent of breakage or loss of containers. In Chart I, K is the symbol for fraction of containers surviving the trips, and is obtained by subtracting the percent breakage or loss from 100 and dividing by 100. For example, if your usual percent loss in production is 0.50, then by reading across on the 0.9950 K line to where it meets the curve, you learn that the average life of the containers is 200 trips.

Moreover, through use of these charts, comparisons may be made of the quality and performance characteristics of containers from different suppliers.

## Instances Charted

Chart II is of interest in two ways: First, it indicates—for three different rates of breakage, 1, 2, and 3 percent—the percent of the original containers that you may expect to have left after any specific number of trips. For example, if the rate of breakage is 1 percent, $K = 0.99$. After 100 trips, you may expect to have approximately 36 percent of the original number of containers.

If the percent of loss differs from those illustrated, a graph similar to Chart II can easily be prepared by use of the following formula:

$$n = n_o K^t$$

where $n_o$ is the number of containers started with—

n is the number left at any time after t trips,

K is the percent surviving the trips, i. e.:

$$\frac{(100 - \%\ \text{loss})}{100}$$

To clarify the formula, suppose you are processing a great many "n" containers. If the average breakage is 1 percent, then after the first trip through the machinery, 99 percent or 0.99n will survive. Now upon placing 0.99n containers once again through the machinery—second trip—0.99n x 0.99 will survive.

The mathematician will find Chart II of interest in that it provides the basis for the derivation of the curve in Chart I. By obtaining the area under the curve (containers vs. trips) and then dividing by the number started out with, there will be yielded the average number of trips made by those containers under a stipulated K value.

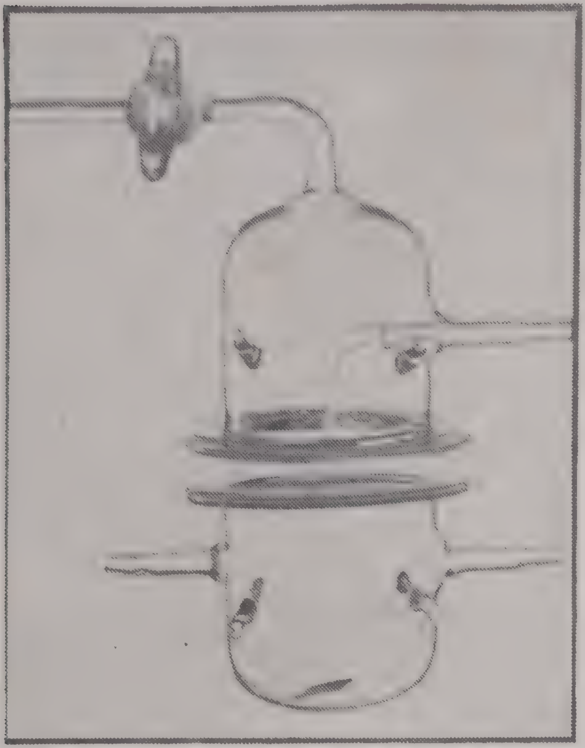
As an example of how the curves may be applied, a large American soft drink company was franchising many bottlers in Brazil—equipping them with the most up-to-date "know-how" and machinery. However, customs regulations imposed exceedingly high tariffs on originally low priced bottles imported from the U. S. And the franchise company found itself stocked, in Rio de Janeiro, with millions of bottles which would cost its Brazilian bottlers at least 20 percent more than bottles made in Sao Paulo.

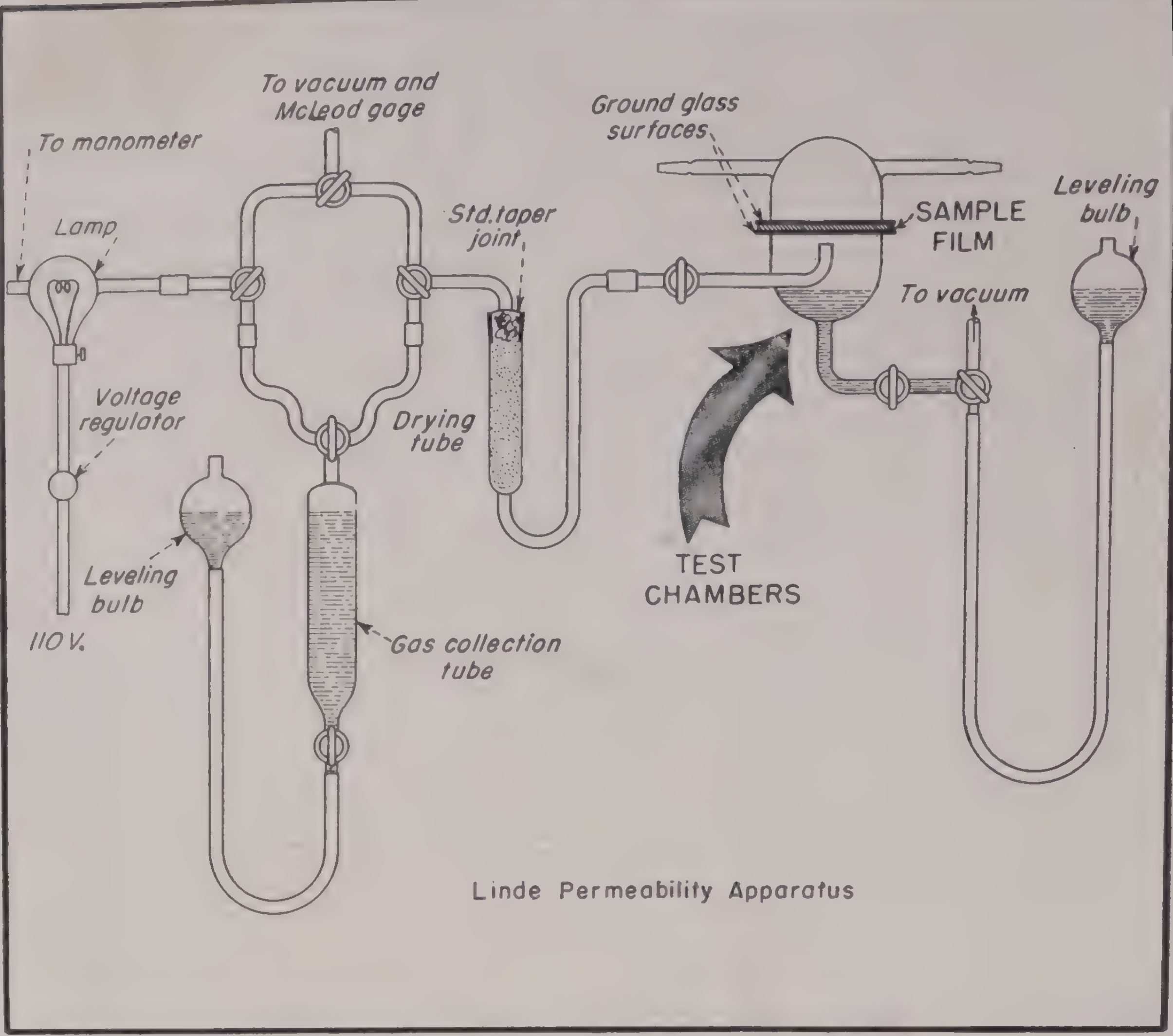
It was apparent that U. S.-made bottles were superior, due to their uniform capacity, weight, appearance, dimensions, and lower initial and subsequent breakage on machinery.

In spite of this qualitative evaluation, the franchise company had to prove statistically that the imported bottles were far superior to Brazilian bottles in order to move them. What was needed, therefore, was data showing how many trips the different bottles made per unit of cost. This was not an easy figure to obtain. But the production breakage loss was available (0.50 percent for American bottles, 1.25 percent for Brazilian). These gave K values of 0.9950 and 0.9875, respectively.

Referring to Chart I, it is seen that the U. S. bottles gave 200 trips as against 80 for the Brazilian. Bottle costs (in Cruzeiros, approximately 5c.) were Cr. 2.20 and Cr. 1.80, respectively. From this it is seen that the U. S. bottles gave 200/2.20, or 91 trips per Cruzeiro as against 80/1.80, or 44.4 trips. In short, that the U. S. bottles lasted 205 percent longer.

**Between these chambers . . . . . . goes sample film. Then with this hookup . . .**





**TECHNIC** depicted here is based on tungsten-filament test for gaging the amount of oxygen diffusing through film into nitrogen-filled chamber.

# Wrapper Test Promises More Shelf-Life

## Quick and accurate method of determining flexible films' permeability to oxygen is important aid in solving gas-packaging problems

**A. T. ZAMBITO**
Laboratory of The Linde Air Products Co.,
Tonawanda, N. Y.

A new method of rapidly and accurately determining oxygen permeability of packaging materials has recently been developed in the laboratory of The Linde Air Products Co., Tonawanda, N. Y. This procedure employs a very sensitive tungsten-filament test for measuring oxygen concentrations as low as 10 ppm.

Permeabilities obtained correspond to those noted under actual nitrogen packaging conditions, where there is nitrogen on one side of the film and air on the other.

As part of the Linde program for studying protective packaging of goods under nitrogen atmospheres, oxygen permeabilities of a large number of packaging materials had to be determined. Films considered for nitrogen packaging are chiefly those with low oxygen permeabilities. And to evaluate these films properly, a sensitive oxygen-permeability test was needed. Furthermore, results obtained by this method must correspond to permeabilities under actual nitrogen-packaging conditions.

### Check of Other Ways

Before the Linde method was developed, several standard procedures were investigated.

One, the Elder method,* is based upon the measurement of pressure changes in a vacuumized chamber as the test gas permeates from the high to the low pressure side of the test film.

Another system, the isostatic method, was developed by D. W. Davis**. Here, two different gases pass through a series of cells on separate sides of the test film. One is a sweep gas, the other a test gas. Pressure on each side of the film is equalized by careful control of gas-flow rates. Sweep gas is then analyzed to determine the total amount of the test gas that it contains.

Most of the other methods described in the literature are modifications of either the Elder or Davis procedures. These methods are widely used in the packaging industry. However, for nitrogen packaging studies it was felt that a sensitive method was required closely reproducing actual packaging conditions, with nitrogen on one side of the film and air on the other.

### About the New Test

Linde's method is based upon a sensitive tungsten-filament test for determining the amount of oxygen that diffuses through a packaging film into a nitrogen-filled chamber.

In analyzing for oxygen, a clear electric-light bulb is evacuated and a sample of the gas to be tested is drawn into the bulb. Filament of the bulb is burned at low voltage, and any oxygen present forms an oxide with the hot tungsten. Oxygen concentration is then estimated by comparing the shade and intensity of the oxide coating on the filament with a set of previously prepared standard tungsten filaments.

This method is extremely sensitive.

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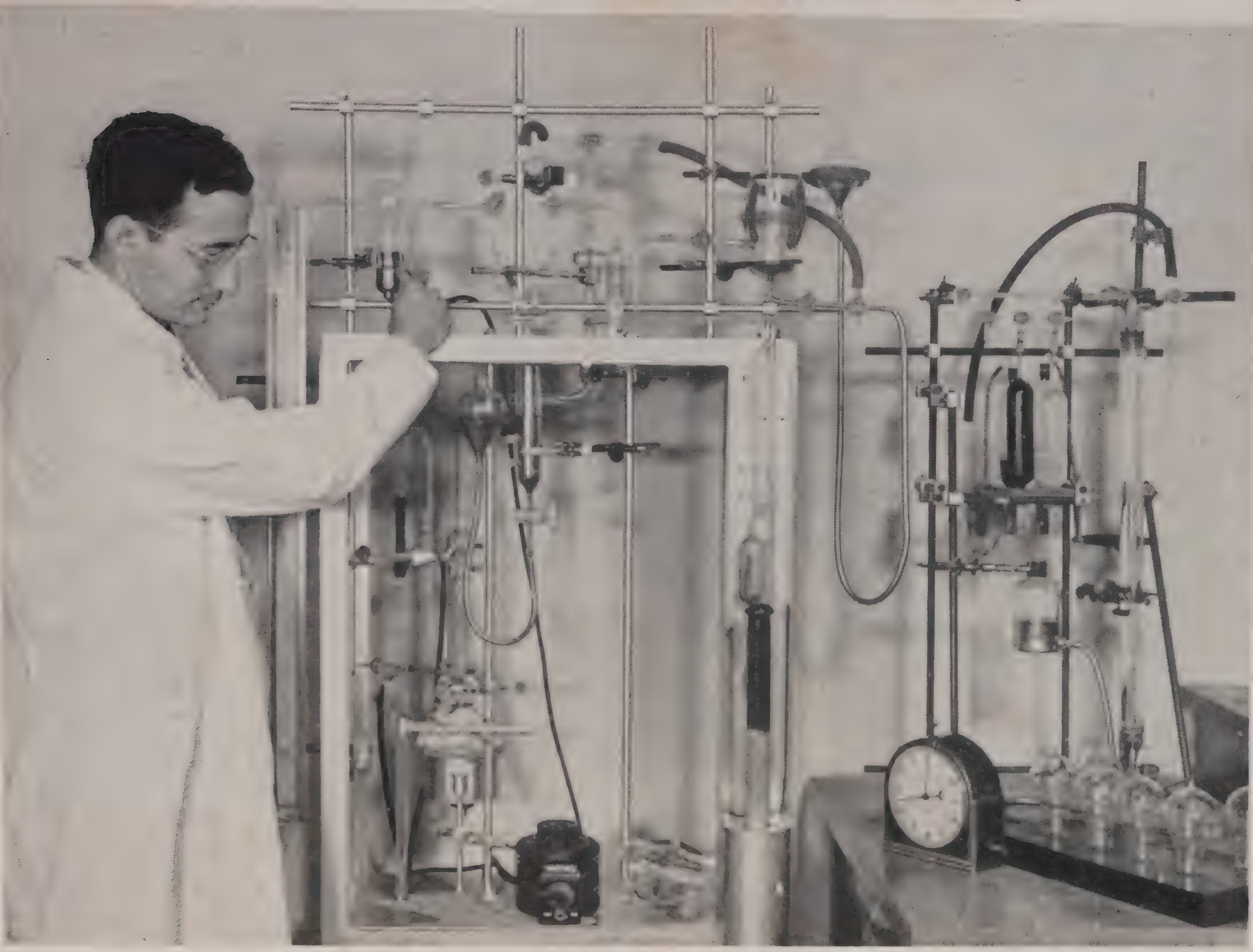
* Elder, L. W., *Modern Packaging*, 16, 686-90, 1944.

** Davis, D. W., *Paper Trade Journal*, 128, No. 9, 33-40, 1946.



. . . test is begun to measure film's oxygen permeability

Results are also obtained under conditions corresponding to actual nitrogen packaging.

### Description of Apparatus

The equipment (see photos and diagram of assembly) consists of the following essential components for the new test:

1. *Permeability cell.* It has two chambers, each with a $\frac{1}{2}$-in., flanged, ground-glass surface. The surfaces of the chambers must be perfectly flat to insure air-tight seals. The test film is placed between the lightly greased ground-glass surfaces, and the two sections of the cell are held together tightly by rubber bands. The lower portion of the cell has an inlet and outlet tube, each containing stopcocks so that the cell can be purged with nitrogen and then sealed. An inlet and outlet tube in the upper chamber permit passage of a slow stream of air over the top surface of the packaging material.

2. *Testing bulb.* A 100w., clear electric-light bulb (depicted in diagram and seen in photo of assembled apparatus) is used for determining the oxygen concentration. An inlet and outlet tube are sealed to the bulb at approximately the same level as the filament.

3. *Voltage controller.* A Variac is required to regulate the filament voltage. The filament is burned at 15v. during the test, and it is flashed at 115v. to prepare the filament for another test.

4. *Standardized filaments.* A set of standard filaments is needed for oxygen concentrations between the 10- to 150-ppm. range. These standard filaments are prepared by evacuating a 100w. clear bulb, carefully adding measured amounts of oxygen and nitrogen, and then burning the filament at 15v. for 1 min. A McLeod gage is used to measure the partial oxygen pressure introduced into the evacuated bulb. The remaining vacuum is released with oxygen-free nitrogen. A description of a set of standard filaments is given in Table I.

5. *Drying tube.* This tube contains $P_2O_5$, which is needed to remove moisture from the gas to be analyzed. It has been found that moisture affects the accuracy of the oxygen determination.

6. *Manometer.* A closed-end, capillary manometer (diagram) is attached to one outlet of the bulb to measure the pressure of the sample of gas to be tested.

7. *Vacuum pumps.* An oil and a mercury-vapor pump are used simultaneously to reduce the pressure in the system below 5 microns.

8. *McLeod gage.* This is used to indicate when the system has been adequately evacuated.

9. *Gas collection bottle and mercury-leveling bulbs.* Gas to be tested is passed from the permeability cell to a gas-collection bottle. A portion of the gas is then transferred into the testing bulb and analyzed. If a large amount of oxygen is present, the gas bottle can be removed from the rest of the apparatus and the oxygen content is determined by standard Orsat procedure. Mercury-leveling bulbs are used to transfer the gas from the permeability cell into the gas collecting bottle.

10. *Nitrogen supply.* A cylinder of high purity nitrogen is necessary for purging the lower chambers of the permeability cells and for preparing standard bulbs. This gas is passed over heated copper to reduce the oxygen to a concentration of less than 1 ppm.

The following steps are outlined for

## Here Are Specific "Working Data" On the New Evaluations

**TABLE I—LIGHT-FILAMENT STANDARDS EMPLOYED** —Colors of filaments vary with amount of oxygen present

| Concentration of Oxygen in Nitrogen (in ppm.) | Appearance of Test Filament After Burning at 15v. for 1 min. |
|---|---|
| Less than 10 | Same as new (no smoke observed after flashing filament for 1 sec. at 115v.) |
| 10 | Same as new (slight cloud of smoke observed on flashing filament for 1 sec. at 115v.) |
| 20 | Dark gray |
| 40 | Light tan |
| 60 | Reddish |
| 80 | Reddish-brown |
| 100 | Dark red |
| Greater than 150 | Black |

**TABLE II—COMPARISON** with Orsat method clearly demonstrates rapidity and accuracy of tungsten-filament way of analyzing for small concentrations of oxygen

| Method | Time | $O_2$ Permeability cc./sq.in./24 hr. |
|---|---|---|
| Filament | 1 hr. | 0.43 |
| Filament | 2 hr. | 0.45 |
| Orsat | 1 wk. | 0.39 |
| Orsat | 2 wk. | 0.44 |

**TABLE III—WIDE RANGE** of oxygen permeabilities ca be determined by tungsten-filament method

| Type of Packaging Material | Thickness of Film (Inches) | $O_2$ Permeability cc./sq. in./24 hr. |
|---|---|---|
| Glassine | ...... | 0.47 |
| Vinyl chloride | 0.0010 | 0.19 |
| Polyethylene | 0.0010 | 2.60 |
| Rubber hydrochloride | 0.0012 | 0.55 |
| Regenerated cellulose | 0.0010 | 0.09 |
| Vinylidene chloride | 0.0020 | <0.0002 |
| Polyethylene coated kraft paper | 0.0054 | 0.040 |
| Laminates: | | |
| Rubber hydrochloride/regenerated cellulose | 0.0032 | <0.0002 |
| Polyethylene/regenerated cellulose | 0.0030 | <0.0002 |
| Paper/regenerated cellulose/foil | 0.0058 | <0.00002 |

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* Oxygen permeability rates determined at 77 deg. F. and 60 percent relative humidity.

Note: After one day, no detectable amount of oxygen had permeated through first two laminates listed in above table. In case of third laminate (paper/regenerated cellulose/foil), no oxygen was detected after a 10-day test period. Permeability rates over wide ranges of temperatures and humidities are obtained in Linde laboratories by this method.

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making an oxygen-permeability measurement:

1. Inspect the test film and place an undamaged section between the lightly-greased, ground-glass surfaces of the permeability cell.
2. Secure upper and lower portions of the cell tightly with rubber bands.
3. Purge lower portion of cell with a stream of high purity nitrogen.
4. During purging, extend a tube from the outlet of the cell to a sulphuric acid bubbler. In this way, the rate of nitrogen flow can be observed. And when the cell is completely purged and the nitrogen is turned off there is no back diffusion of air into the cell before the stopcocks are closed. It has been found that the cell is free of oxygen in about 10 min. with a nitrogen flow of approximately 1 liter per min.
5. Place the purged cell under controlled temperature conditions.
6. Pass a slow stream of humidity-controlled air through the upper chamber.
7. Attach the cell to the analyzing portion of the apparatus (see photo of assembled apparatus) after a suitable period of standing, depending upon the anticipated permeability of the film.

### Analyzing for Oxygen

8. Determine the oxygen content in the lower part of the cell. To analyze for oxygen, the apparatus is evacuated to pressure below 5 microns, and the test gas is transferred, by displacement with mercury, from the bottom chamber of the cell through the $P_2O_5$-drying tube into the gas-collecting tube. This method of transfer is employed to prevent distortion of the test film by the application of vacuum.
9. Pass a small sample of gas (approximately 30-50 mm. pressure, as measured on the attached manometer) from the collecting tube into the testing bulb.
10. Burn the filament of the bulb at 15v. (red heat) for 1 min. Any oxygen present forms an oxide coating on the tungsten filament.

### Comparing With Standards

11. Estimate the amount of oxygen that was present by comparing the shade and intensity of the oxide coating with a set of standardized filaments. By a visual comparison, it is possible to estimate oxygen concentration to the nearest 10 ppm.
12. Analyze a larger sample (400-750 mm.) if no oxygen is detected in the first small sample tested. By varying the amount of gas employed in a test, it is possible to determine oxygen concentrations between 0.001 and 0.35 percent.
13. Remove gas-collecting tube if larger quantities of oxygen are present and analyze the remaining gas sample for oxygen by absorption in alkaline pyrogallol (0.2 percent oxygen can be accurately determined by this method).
14. Burn the filament for 1 sec. at 115v. after completing one determination. Now the oxide coating is volatilized and the filament is ready for another test. A bulb can be used for about 15 oxygen determinations. If more determinations are made, the glass surface of the bulb begins to cloud from tungstic oxide deposits and the filament becomes obscured and difficult to compare with standard filament.

### Calculations Briefed

Oxygen determinations can be made with any size gas sample, and the results calculated accordingly. Since the volume of the test bulb is constant, the size of sample is determined directly by manometer readings.

The following equation is used for calculating permeability rates:

$$\text{Filament reading X } \frac{760}{P} \text{ X } \frac{V}{A} \text{ X } \frac{24}{h} =$$

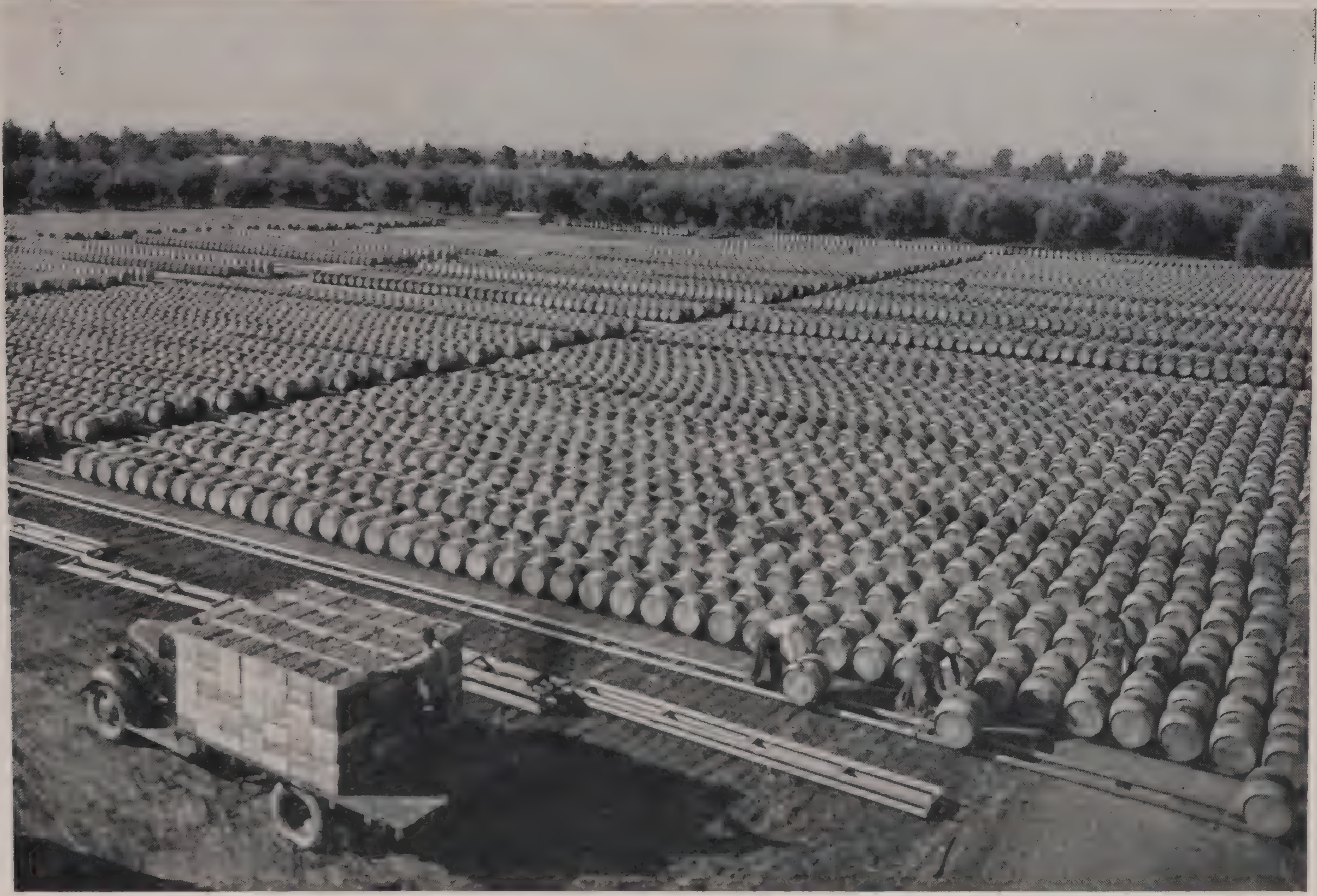
oxygen permeability in cc./sq.in./24 hr.

Where $P$ = pressure of test-gas sample in mm.
$V$ = volume of lower chamber of cell in cc.
$A$ = exposed surface area of test film in sq. in.
$h$ = standing period in hours.

Oxygen analyses obtained by this method have been checked against Orsat analyses in the following manner.

### Orsat and Filament Methods Check

Samples of films with high oxygen permeabilities were placed in cells and held under controlled temperature and humidity conditions. Two samples were removed after 1- and 2-hr. periods, and the amount of permeated oxygen was determined by the tungsten-filament method. The other two samples were removed after 1- and 2-wk. periods, and oxygen concentrations were determined by absorption in pyrogallol. Results of this comparison are shown in Table II.



**ACRES OF BARRELS** of green olives undergoing fermentation—striking evidence of size of the Lindsay operation.

# Operation Olive

At expansive Lindsay plant, it is now big-scale, with many processes and materials-handling tasks mechanized. And company is turning out more than one-fourth of all ripe olives canned

**J. R. WEBSTER**

Chief Chemist, Lindsay Ripe Olive Co., Lindsay, Calif.

Problems of olive processing are intensified because of the small size of the fruit, its perishability when fresh, and the immense quantity that goes to make up the total annual tonnage handled at The Lindsay Ripe Olive Co., Lindsay, Calif.

During the height of the season, daily receipts of all varieties run as high as 270 tons. Total annual receipts will amount to around 6,000 tons, and this quantity is harvested and delivered to the plant in less than 60 days.

Even in this, the world's largest olive processing plant, it would be impossible to process such quantities of fruit daily. But, unlike other fruits, olives can be stored (November to July) in a light brine solution. This serves a dual purpose. It allows the processor time to put up a quality pack and affords the unusual economic advantage of extending the operation of the plant and employment of workers over a period of nine or more months.

At the season's peak, the company employs 300 workers. Other than operating personnel, the largest number of these are trained to visually inspect the fruit for its condition of quality and, at the same time, remove any foreign material from the product flow on grading and inspection belts. Thereafter, with few exceptions, the fruit is handled mechanically or in flumes. Special machines have been designed and built to process the olives with speed and care. Other equipment has been adapted from allied industries.

### Harvesting and Delivering

Optimum harvesting times are determined by the color and texture of the olives. In California, they are harvested during September and October. Fruit is picked when its color is straw-green to light-pink and when juice can be readily squeezed from the flesh with the fingers. The greatest volume of olives processed at this plant is of the Manzanillo variety. Smaller

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**For a "Blueprint Perspective"—**

**showing how these varied processing steps fit together, turn to the graphic picture-flowsheet on pages 100-103 of this issue.**

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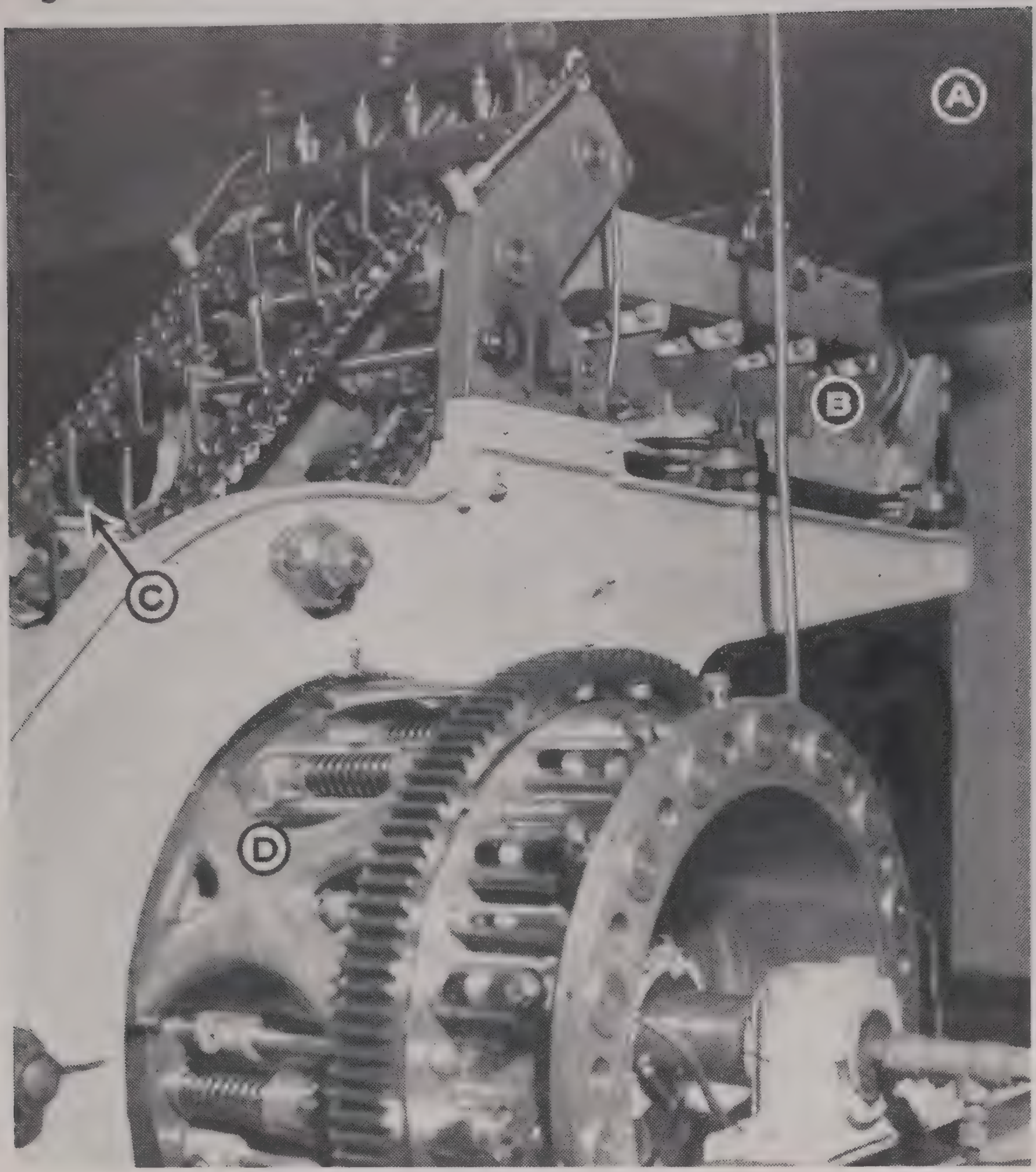
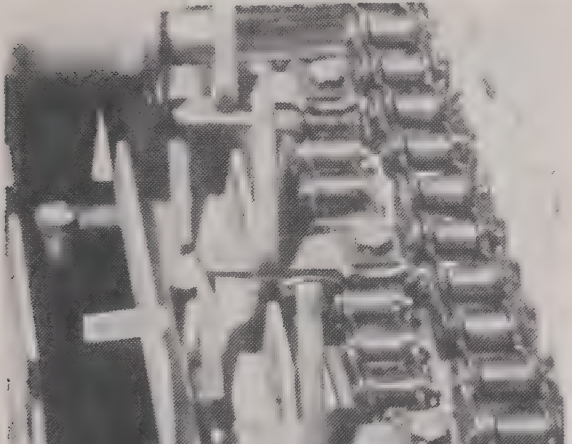
### Ingenious Machine Removes Pits





**OLIVES** to be pitted are supplied to hopper (A) by an overhead conveyor. From hopper, they fall onto vibrator (B) that feeds them into two "U"-shaped troughs. Finger links (C), suspended from two chain conveyors, guide olives to pitting mechanism, operated by cams on gear-wheel (D). Pits fall into bins, below, and olives are flumed to a flotation tank. Eight pitters are used, each with a capacity of 800 to 850 olives per min.

←**CLOSE-UP** of "U"-shaped trough (designated by arrow) down which olives are guided in an accurate procession by finger links (also shown).

quantities of Ascalano, Sevillano and Mission varieties provide the company with all sizes of fruit.

Olive pickers empty their containers into lugs, holding 35 to 40 lb., which are then stacked on pallets, previously arranged on flat bed trucks. The loaded trucks are driven upon a 60-ft. scale at the plant and the net weight is computed.

Two lift-trucks, working on opposite sides of the flat truck, quickly unload and move the pallets to the receiving conveyor. A composite sample of the lot (a lug-box full) is taken here and sent to the sample-grading department. Growers are paid according to the size and cullage of their fruit, based on the grade of the composite sample. One payment is made immediately on delivery and other frequent payments are made throughout the year.

Lugs of Manzanillo olives are unloaded from the pallets by hand and placed on the conveyor belt. Inside the plant, the olives are automatically dumped from the lugs onto the deleafer. Empty lugs continue on the conveyor and return to the loading area. At the end of the belt, they are sprayed with an insecticide before being reloaded on pallets and returned to the olive groves.

Other varieties are moved from the scales to a receiving platform by power lift-truck and thereafter are transported, inside the plant, by hand lift-trucks.

Lug boxes of Manzanillos are conveyed into a series of metal guides which tilt each box at an angle, dumping out the olives. The fruit slides down the metal grill of the deleafer, where leaves and twigs drop through the interstices and the olives roll onto the sorting belt. Workers at this belt break up clusters of fruit and remove extraneous material not separated by the deleafer.

#### Grading the Olives

From the sorting belts, olives are conveyed to the diverging-cable size-graders. These graders are of different sizes, the ones used for Manzanillo olives being the smallest. Fruit of all sizes falls onto the cables and, as they are conveyed across, the olives fall between the interstices according to size. Canvas sweeps, fixed at intervals across the grader, position the fruit so that it rides with its smallest axis at right angles to the movement of the cables. Thus, each olive drops between them at the proper point and into the correct size-hopper.

Manzanillos are separated into seven sizes. The smallest fruit drops into mobile bins and is routed to the Spanish process, and the six other sizes fall into padded hoppers, thence onto transverse belts that convey them to elevators that feed overhead flumes. Light brine is used to flume the olives to storage tanks. These flumes, the longest of which is more than 450 ft., are constructed of heavily paraffined redwood. Surplus fluming brine is recirculated by portable pumps that remove it from the tanks in which the olives are stored.

From the large grader the other varieties of olives drop into protected hoppers and thence onto transverse belts which convey them to bins. These bins, of 1,200 lb. capacity, have sloping floors and, on one side, a door that is opened for dumping the olives into storage tanks. Lift-trucks are used to move these bins about in the plant.

Ripe olives are stored, according to their sizes and varieties, in redwood tanks of 6,000 gal. capacity.

Storage brine is maintained at a strength of about 8 percent salt. If a weaker brine is used, spoilage by osmosis and microorganisms will cause the fruit to develop soft spots or blisters, either during storage or later in the process. A stronger brine will cause the olives to shrivel.

Brine used in the various processes is first manufactured in a 50,000 gal. concrete sump. Half-ground salt is dumped into this sump and water is added to make a saturated brine. This solution is later pumped into six 4,700 gal. diluting sumps, where water is added and mixed by agitation with compressed air. Brines of various strengths are made here, then pumped into the storage tanks and the processes as needed.

The 50 percent caustic soda solution arrives at the plant in railroad tank-cars and is pumped into a steel storage tank. When needed for processing, the caustic is pumped to concrete diluting sumps, located in the ripe-olive processing department. Here, it is diluted to proper strength with water and mixed by compressed air agitation. The three major processes draw on these sumps for their supplies of caustic soda.

### Spanish-Type Green Olives

Identified by its yellow-green skin, light flesh, and light brownish to buff-colored pit, the Spanish-type green olive has a characteristic flavor and aroma imparted by lactic acid fermentation. Any variety of olives can be used for this process; the Manzanillo and Sevillano varieties, however, are preferred. These olives are also pitted and stuffed.

The process used to produce Spanish-type olives is somewhat similar to, but considered to improve upon, the one used in Spain. The olives are initially moved from the grading department to tanks, 12 ft. in dia. and 3 ft. deep. Here, the fruit is immersed in a 1 to 2 percent caustic soda solution and is kept submerged by slatted lids which fit into the tanks.

No set period of time is allowed for caustic penetration, since this depends upon the strength and temperature of the caustic solution, maturity of the fruit, and other factors. When penetration has proceeded deep enough to remove most of the bitterness, the solution is drained from the tank and the caustic is extracted from the olives by successive water leachings, which continue during a 24 to 48 hr. period. All changes of liquids are made quickly to prevent oxidation of the fruit.

After caustic treatment, the olives are pumped from the tank into 50 gal. oak barrels, the final wash water being drained off as the fruit enters. Barrels are then filled with a 10 to 15 percent brine, barrel heads are replaced, and hoops are tightened with a powered hoop-driver. Now, the barrels are rolled out into the fermenting yard. Here, the strength of the brine usually levels out to approximately 5 to 8 percent.

During fermentation, the flesh is altered, or cured—becomes firm and salty and a light shade of yellow-green. The fermentation is accompanied by an increase in the acidity of the brine caused by the formation of organic acids, chiefly lactic. Gas is liberated, and a slight amount of foam and froth flows from bungs until fermentation ceases.

A period of several months is required to complete fermentation. During this time, make-up brine is added to replace that lost through the bungs. This is done to keep the fermentation almost anaerobic, to prevent undue growth of molds and yeasts, and to guard against discoloration of the fruit from exposure to air. Occasionally, some sugar is added to supplement the natural olive sugar. In the final product, the olive sugar is changed to acids, mostly lactic, (approximately 0.8 to 1.0 percent, with the pH about 3.8).

### Grades and How They Grew

**Mission olives were the first variety to be grown in California. And they yielded fruit of six different size-grades—Pewee, Petite, Standard, Medium, Large, and Extra Large.**

**Then groves of other varieties began to "come in," each with larger size fruit. And so new names had to be added. Contributed by the Manzanillos were sizes given the names Mammoth and Giant.**

**From the Sevillano and Ascalano varieties there then came even larger olives, resulting in four more names — Jumbo, Colossal, Super-Colossal, and Special Super-Colossal—bringing the size-grades to the present total of twelve.**

This fermentation proceeds much more rapidly at a temperature of 90 deg. F. Therefore, when sales and market conditions justify quick production, barrels are often incubated in heated rooms.

When fermentation is complete, barrels are moved into the plant, emptied, and the fruit is size-graded and inspected for quality. Most equipment in this department is fabricated of stainless steel.

Olives are then returned to barrels in the original brine and are ready for shipment.

During the harvest season, some of the fruit is size-graded only. These olives are pumped from the storage tanks and flumed to sorting belts, where workers remove any extraneous material and overripe or damaged olives before the fruit is conveyed to a baffled chute, through which it drops into elevated mobile bins. Baffles in the chutes are rubber covered. Fruit that was previously size-graded and sorted is pumped directly from the storage tanks to the mobile-bins.

Bins are moved, manually, from the chute to the processing tanks and are emptied through doors in the sides of the bins. This department is interlaced with pipes supplying new brine, return flume brine, caustic soda solution, steam, water, and air under low pressure.

Alternate applications of caustic soda solutions, water, and air, over a period of nine days, darken the fruit and hydrolyze its bitter glucoside, *oleuropein.* Two days are spent washing the caustic out of the olives, and two more days are required to bring them to the proper salt content by putting them in hot brine.

The fruit is then immersed seven times in 1 to 2 percent caustic soda solutions at room temperature for periods from 2 to 6 hr. During each application, the solution is allowed to penetrate the flesh of the fruit to controlled depths. Progress of the penetration can be discerned by placing a drop of dilute phenolphthalein solution on the cut surface of an olive. The amount of flesh penetrated by caustic will turn red.

### Fruit Darkened by Oxidation

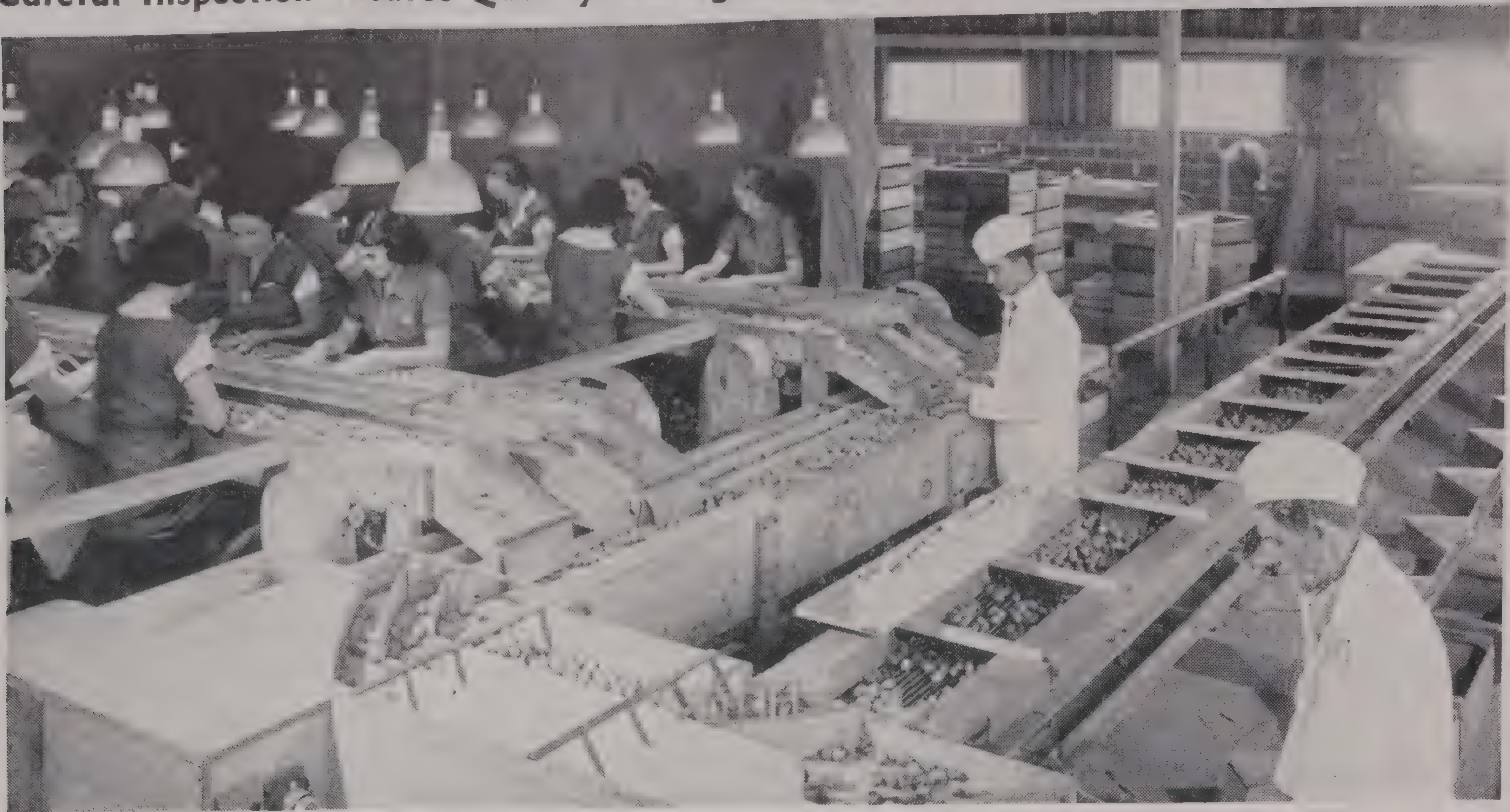
Between caustic solution applications, the fruit is immersed in water and exposed to air for periods of 24 to 48 hours to oxidize it. The air, at about 2 psi., is blown upward through the immersed fruit from spreader pipes fixed in the bottom of the tank. To make certain that oxidation is uniform, a worker stirs the fruit with a compressed air jet every 5 or 6 hr. Oxidation turns the olives to a dark brown or black color.

Upon completion of the darkening and hydrolyzing process, the caustic and bitter factors are leached from the fruit by immersing in fresh water. Nine such washings are given, the water being changed every 4 hr.

After being freed of caustic and their bitter principle, the olives are put in brine. This brine is brought to 160-185 deg. F. by a steam heating device placed in the tank. A jet of steam draws the brine through one end of this device and forces the heated liquid out through the other end. The fruit is treated twice with brine, each treatment lasting 24 hr. Spent brine used in the initial treatment is drawn off and a second solution added.

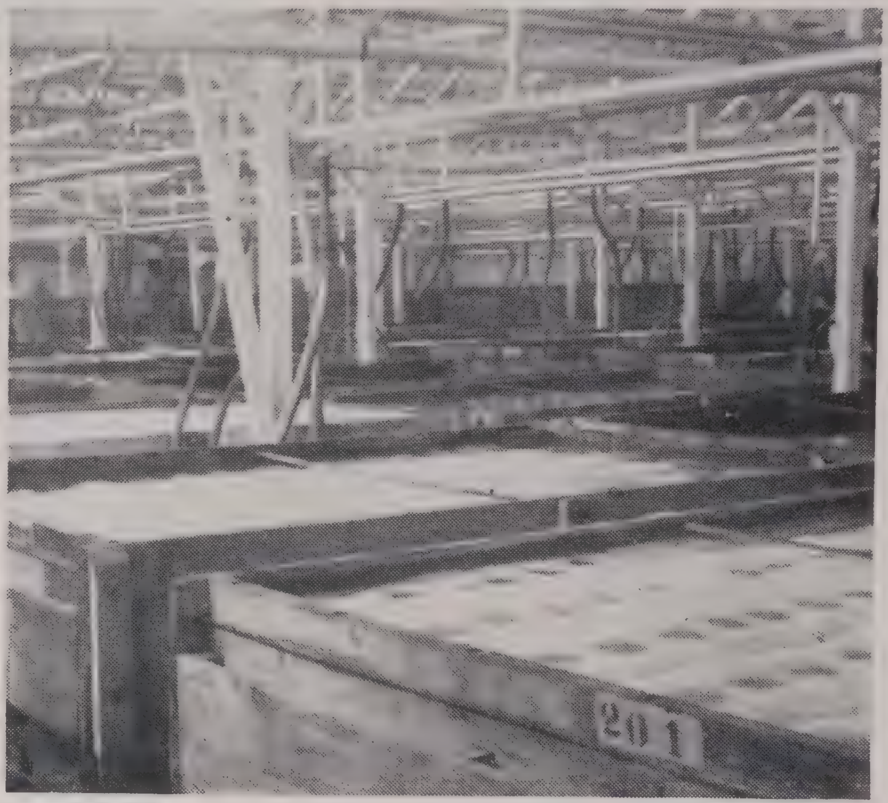
Olives are now ready for canning. They are flumed to a sump and thence

# Careful Inspection Insures Quality During Storage and Processing



**SORTING.** Overripe or damaged olives, leaves, twigs, and other extraneous matter, are removed by trained workers.

**STORAGE.** After sorting, olives are size-graded, then stored in 8 percent brine in these 6,000-gal. redwood tanks.



**OXIDATION.** Here, olives submerged in water, are darkened by introducing air. Note clear spots over air inlets.

to the second size-grader. This grader makes a final separation, insuring uniform canning sizes. From the size-grader, the olives are conveyed to a final sorting-belt, where workers again inspect them, removing any poor quality fruit. The olives then move into the filling and canning line.

### Green-Ripe Olive Process

Sometimes specified "home-cured," green-ripe olives are processed in a manner similar to ripe olives, except that the oxidation periods are eliminated in order to produce the characteristic light green colored product. Only freshly picked olives can be used in this process. Fruit stored in brine does not produce the typical green-ripe color or flavor. This process is carried out in the same vats used for the ripe olives. Slatted vat-lids are then placed over the fruit.

Only two caustic solutions are applied to this product: The first remains for about 18 hr., when it is drained off, the second applied for about 24 hr. The caustic is then leached from the fruit with water that is changed every 8 hr. over a period of 3 days. Olives are then immersed in a 3 percent brine, which is changed four times during a 2-day period. They are next flumed to the final size-grader and sorting belts, then go to the filling and canning line.

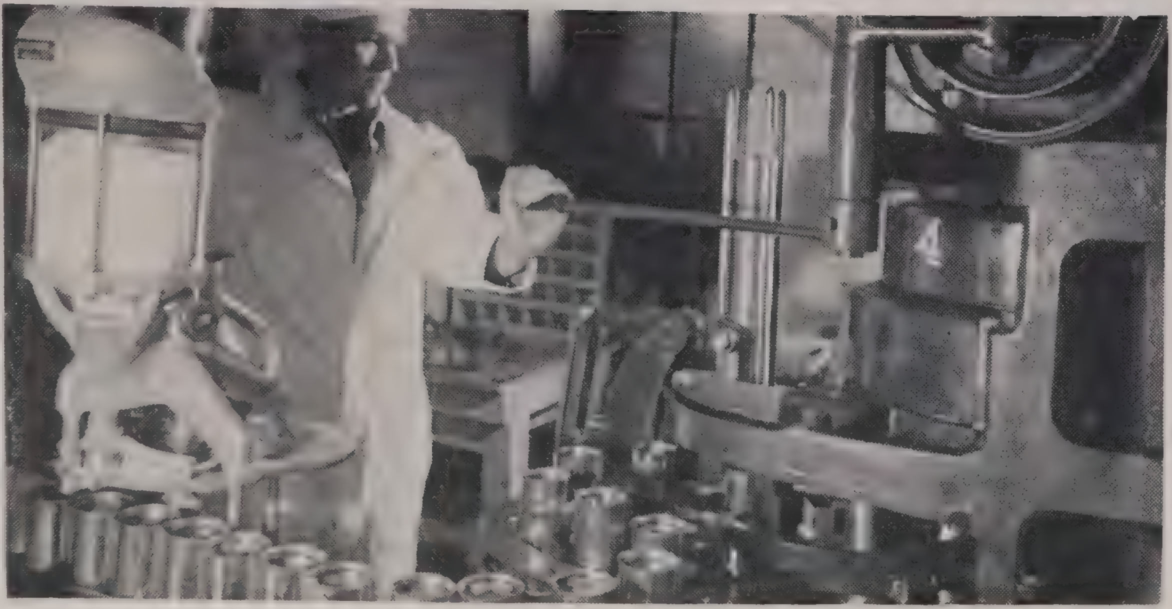
Sodium hydroxide solutions, used for pickling, may be re-used several times. They are drawn off the fruit and flumed in gutters to sumps, where they are titrated and sufficient lye is added to bring them to the desired strength.

### Pit Them With Special Machine

To extract the seed from a fruit as small as the olive at high speed, and yet remove only a minimum amount of the flesh, requires a precision-type machine operating at small tolerance. Since there were none on the market, the company designed and built its own machines for this operation.

Processed olives are moved into the pitting department in mobile bins and

## Salting Improves Flavor



**PACKAGING.** Dispenser adds dry salt to olives, seamer closes and seals can.

## And Sterilizing Prevents Spoilage

**RETORTING.** Sealed cans are loaded into cookers and sterilized at 242 deg. F.

dumped into a sump. An elevator raises the fruit to a size-grader, from which they go by overhead conveyor belt to the hoppers above the eight pitting machines. Diverting arms, placed across this belt, sweep a required amount of olives into the hoppers of these machines.

By means of a vibrating feed-mechanism, the olives are fed into two "U" shaped channels, or troughs. Finger-links, suspended from two moving endless chains, guide the olives in accurate procession down the troughs to the pitting mechanism. By the time the fruit reaches this point, the finger-links have accurately positioned the olive in the trough so that it is rolling with its greatest axis in a horizontal position.

When the olives reach the bottom of the trough, a special set of spring actuated steel fingers, attached to the periphery of a revolving metal cylinder, move through a slot in the trough and hold the olives tight against the first set of fingers while the fruit moves around with the revolving metal cylinder.

On this cylinder, directly adjacent and to one side of the fingers, are punch pins. And on the other side of the fingers are coring and pocket tubes. The pitting operation takes place as the olives move around the axis of the cylinder. A coring tube moves in from one side and makes a circular cut in the olive. Simultaneously, the punch pin advances from the other side and rests against the pit. The coring tube then recedes into a pocket tube. The pocket tube moves firmly against the olive and the punch pin enters from the other side and punches the pit into the pocket tube. The pocket tube then recedes and the pit is expelled from it and falls into a bin below.

The pitted olives drop into a flume and are carried to the flotation tank. In this tank, a brine of 4 percent salt floats all pitted olives. This fruit is removed by an elevator and conveyed to the canning department. Any unpitted fruit sinks in the brine. Because some of these olives have been scarred by the pitting-machine's punch pin, they are recovered and routed to the chopped olive department. Capacity of each pitting machine is about 800 olives per minute.

### Final Inspection and Canning

Ripe or green-ripe olives are flumed in brine to a final size-grader. The fruit drops from the grader into flumes which carry the product to four sumps. Elevators move the olives from the sumps to four sorting belts, where workers give them a final inspection before canning (as illustrated on the front cover of this issue). The olives move by flume and conveyor belt to hand-pack filling-bowls and are packed into cans.

Filled cans move on a chain conveyor to water jets, where they are filled with 200 deg. F. water. Cans are then tipped to provide headspace, salt is added by a dry salt dispenser, and finally lids are seamed on by the usual can-closing machine. There are three of these canning lines.

Canned olives, from the closing machines, are now stacked on retort trays, and the loaded trays are lifted onto small rail cars by electric hoists. These cars rest on wooden skids and are moved with a lift-truck to the nearby horizontal pressure cookers. Cars are pushed off the skids onto rails and rolled inside the cookers.

The cooker doors are sealed, air is vented, and the steam pressure is brought up to 12 psi., providing a cooking temperature of 242 deg. F. This temperature is maintained for 62 min., after which cooling water is sprayed onto the cans and, at the same time, steam that carries air is forced in to maintain the pressure. This pressure is lowered by venting gradually as the cans cool. The cars, which were coupled together when the cooker was loaded, are now pulled out by a powered capstan. The California State Department of Public Health supervises the sterilization of olives. Cooking times and temperatures for each batch are automatically recorded for the department's inspection.

Canned olives are cooled further overnight, and they are then automatically labeled, cased and sealed. Filled cases are stacked on pallets and moved into the case-goods warehouse by motor lift-truck.

Steam for the process is supplied by two 150 hp. boilers.

### Processing Steps Carefully Checked

Quality control of the various products is handled in the company's very well equipped laboratory. Each day, samples of canned olives of the previous day's run are checked for vacuum, net weight, product size, salt, flavor, texture, color, uniformity of grade, and defects. About 400 cans per day are vacuum-checked with a fast flip-tester. There is a daily quality inspection of all sorting and packing operations, and of plant sanitation conditions, and a report is made to the plant superintendent. The fermenting Spanish-style olives are checked regularly for salt, acid and sugar.

Stored olives, in brine-tanks, are inspected, and small samples are periodically processed. Storage brine is tested regularly for acid and salt. Olives destined for the oil mill are checked for oil and free fatty acid content, while the press cake from the mill is regularly sampled for oil content. The new oil is rated periodically.

Supplies of bulk salt and caustic soda are tested for moisture and color. Corrosion in the boilers, motor vehicle radiators, and other places throughout the plant, is checked upon in regular tests, and recommendations are made regarding its control. The quality technicians exercise periodic rodent-control measures, formulate specific cleaning compounds, and assist in other problems of sanitation. Research is largely confined to seeking ways to bring more attractive color, better texture and flavor to the various olive products, and also to searching out methods which will reduce losses.

### Other Olive Products

Chopped olives and minced Spanish-type green olives are made from fruit of the best quality. They are chopped in a seeding machine similar to that used in seeding raisins and other fruits. Fed into a hopper, the olives drop between a drum (covered with heavy, soft rubber) and a shaft of saws set in gangs, six saws to the inch. The interstices between the square-end teeth of these circular saws are so small that olive pits cannot become lodged.

In operation, the saw teeth press into the rubber on the drum and, as the fruit passes between drum and gang-saws, the flesh is stripped from the pits. The latter drop into a waste hopper, and the fruit is removed from the teeth by stripper fingers. Flesh then drops between a cutter comprised of another smaller drum and a cylinder of knives, having about six knives per inch of shaft, which cuts it into still smaller particles. The fruit then falls into a brine flotation tank, where the density of brine will float only the olive flesh. Any other material, such as occasional seeds, that may escape the seeding-machine, sinks to the bottom.

Chopped ripe olives are seasoned, then packed in 4½ oz. tin cans. Next, they are pressure-cooked under the same time and temperature conditions as used for other ripe olive products. Minced Spanish-type green olives go from the flotation tank directly into barrels.

The company also manufactures Calimata olives. This product is made of mature Mission or Sevillano variety fruit in a process similar to that for the Spanish-style olive. Some vinegar and traces of selected spices are added during the process. Calimata olives are packed in glass jars, and a quantity of fine olive oil is added to the brine.

The fruit that is over-ripe is unsuited for canning, yet it is good material from which to make fine, rich oil. From these olives, the R. B. Maselli Co. manufactures oil on a custom basis, in accordance with Lindsay Co. specifications. It is packed under the Lindsay label.

At the oil plant, which is adjacent to the Lindsay buildings, the olives are first washed in warm water. They are then elevated to a disintegrator that is powered by a 30 hp. motor, and here the flesh and pits are ground. This macerated material moves through chutes, as needed, to the bull-wheels. These consist of two heavy stone wheels (1¼ tons each) which roll around a flat stone basin.

The macerated product falls into the basin and the crushing action of the stone wheels ruptures the fruit's cells, making it easier to extract more oil.

Workers then fill strong, flat cocoa fiber bags with the crushed material and stack them in the primary press. Pressure on the stack of filled bags is applied by a hydraulic press at 5 tons per sq. ft. This first pressing extracts most of the olive juice and about two-thirds of the oil.

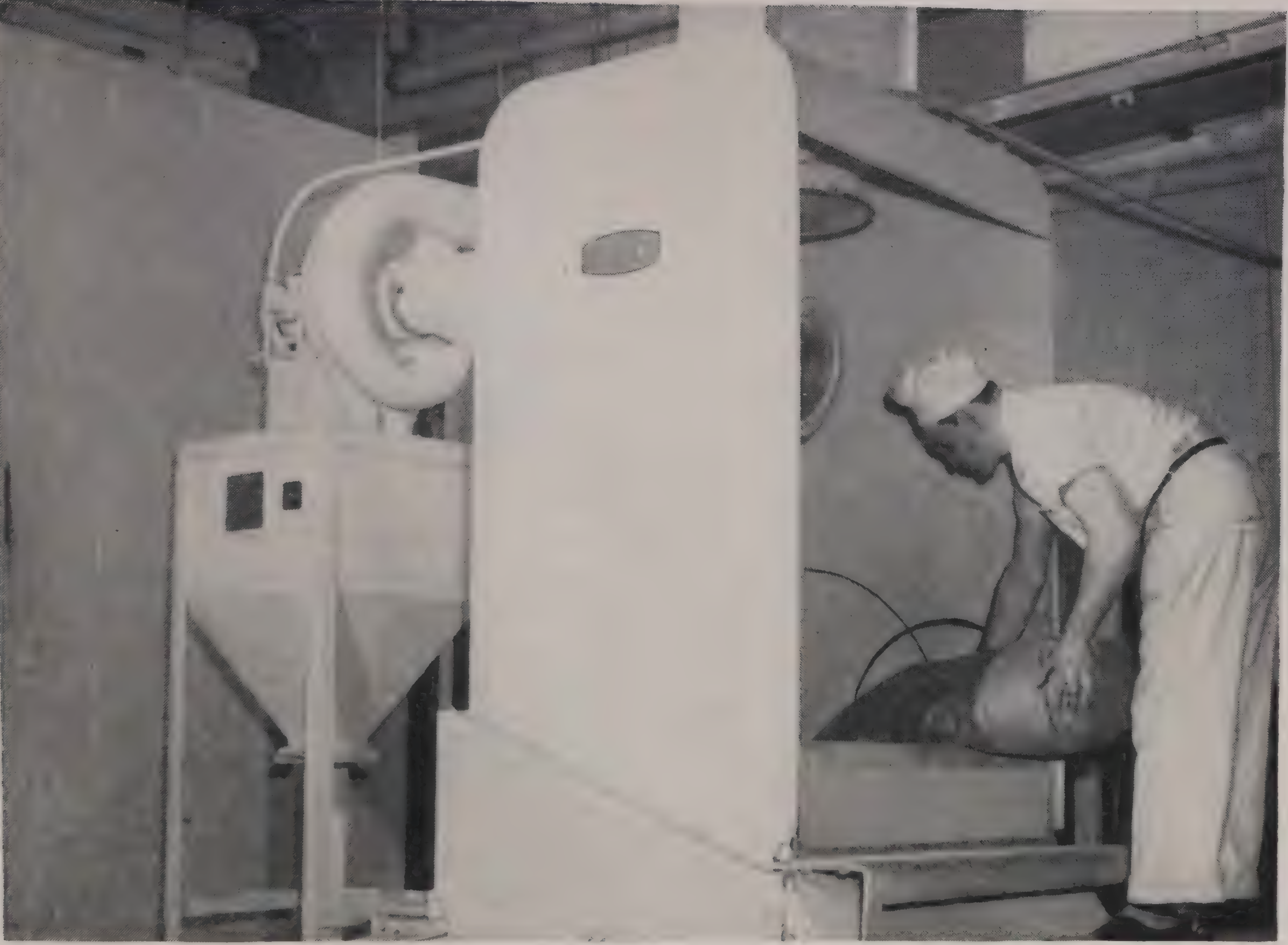
Bags are then moved to the secondary presses and the remainder of the oil is expressed under hydraulic pressure of 30 tons per sq. ft.

### Juice-Oil Separation

The mixture of oil and juice is then pumped to settling tanks, where the juice drops to the bottom. Oil that floats on the surface is mixed with warm water and washed by centrifuging at high speed—15,000 rpm. The juice is then withdrawn and centrifuged to reclaim emulsified oil. This oil is mixed with water (135 deg. F.) and again centrifuged to remove most of the remaining juice. The combined oil is then strained through canvas, in a plate and frame filter, and pumped to steel storage tanks.

The new oil contains a very slight amount of emulsified juice. A storage period of about two months at room temperature permits settling of this juice and allows time for hydrolysis of the remainder of the bitter principle. The oil is then filtered two more times through crepe-paper and cloth and finally bottled, canned, or filled into drums.

**PROCESSING PLANT** of The Lindsay Ripe Olive Co., a growers' cooperative comprising 180 members whose groves cover more than 2,000 acres. Photo shows olive grove (foreground) directly in front of the caustic treatment tanks (left) and fermentation yard for Spanish-type olives. Processing buildings may be seen in the rear.

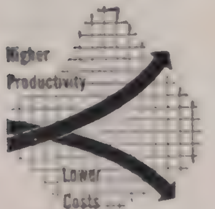


**IN "TAKING UP THE SLACK"**, this flour-handling equipment played a vital role. Installed directly below second-floor mixers, it greatly shortens travel between flour storage and use. Old system stretched to fourth floor.

# Modernization—By Contraction

Williams trimmed the top off its plant and compacted its four-floor line into two floors with new equipment. Results: Higher output, better bread, lower costs

**JOHN V. ZIEMBA**
**Assistant Editor, "Food Industries"**



Working a revolution in its bread-making line, Williams Baking Co. of Scranton, Pa., recently achieved these four goals: (1) Greater production efficiency, (2) higher uniformity in product quality, (3) improved working conditions, and (4) a more attractive plant, aiding the company's promotion of public relations.

But particularly striking is the fact that the company expanded its operation—by contracting it!

Paradoxical though that sounds, simple logic quickly tells the story: Williams found that the key to its scheme of progress lay in compacting its baking line—from the former loosely-knit operation, that stretched out over four floors, down to a new close-clicking operation on but two floors.

No longer needed, the fourth floor was trimmed from the plant.

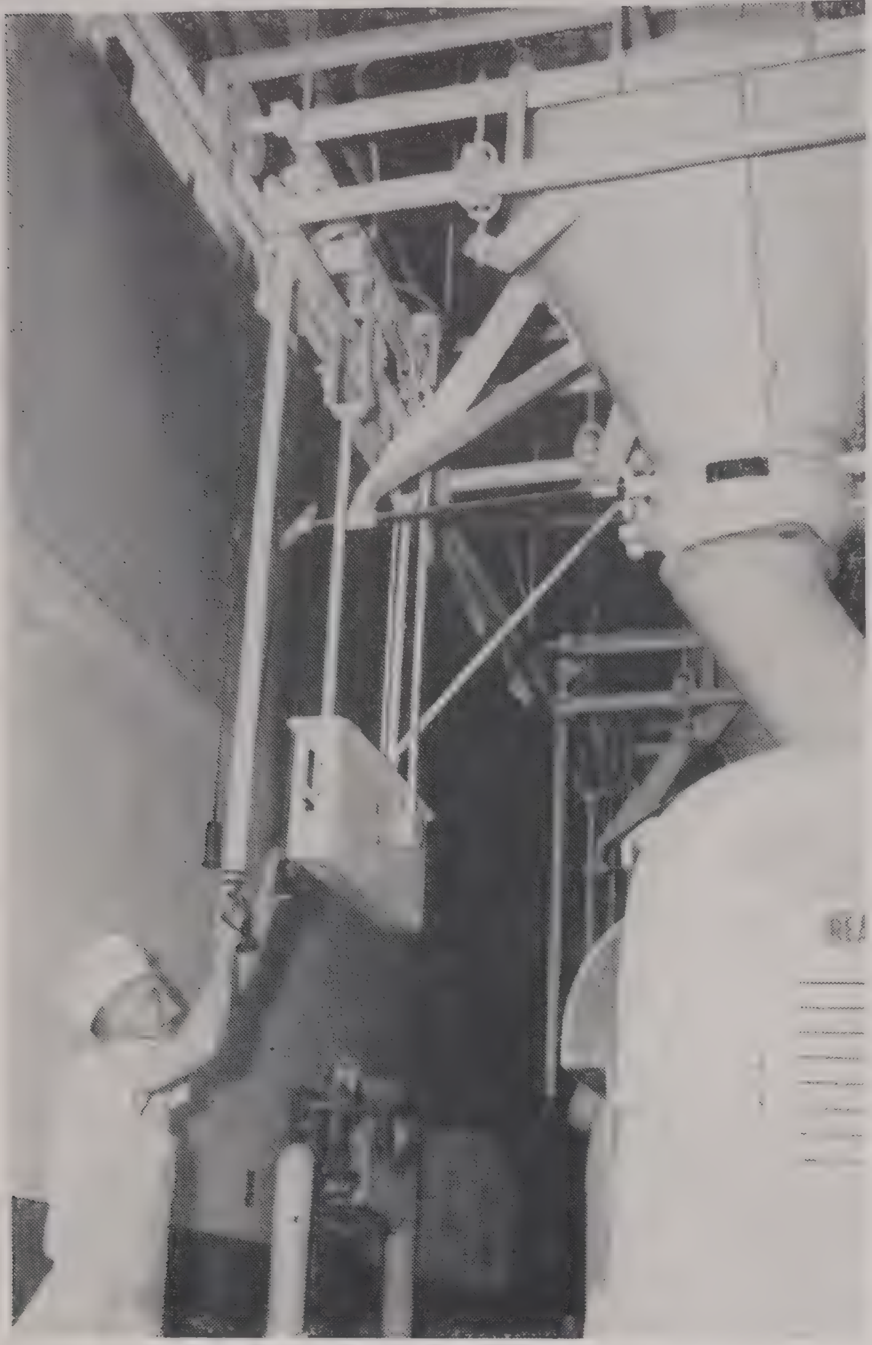
### Done With Advanced Equipment

The efficiencies were attained by following a careful plan of revision. High-speed mixers and sanitary, labor-saving, ingredient-storage bins were installed. Then high-capacity automatic flour-handling equipment replaced the old. And conveyors—bucket, worm-screw, canvas-belt, roller, and overhead-trolley, as well as chutes—were put in all over the bakery.

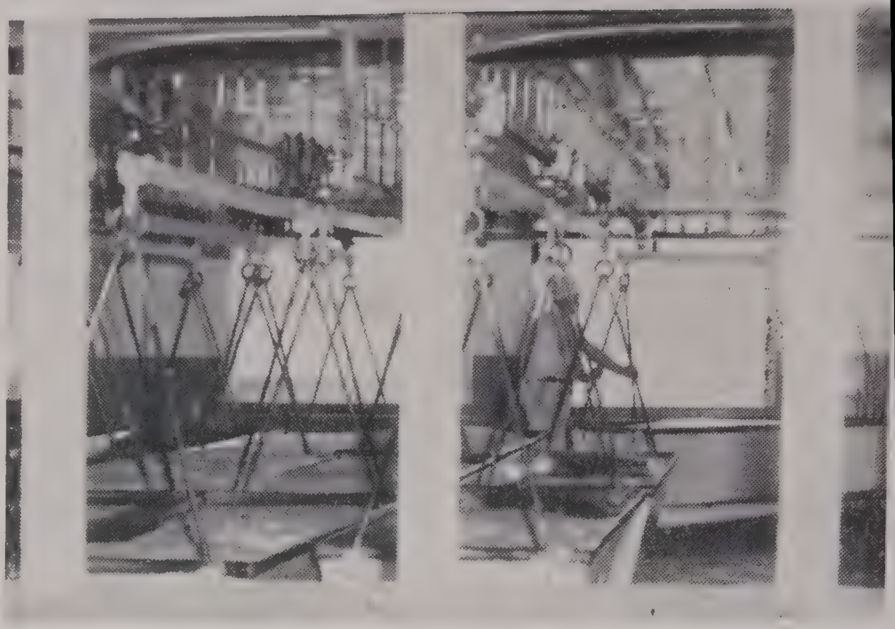
The company then began cutting down on the travel distance in the baking line, the old fourth-floor storage bins, from which the flour was fed, were moved down to the first floor, directly below the second-floor mixing department. Next, by relocating the bread slicing and wrapping machines on the first floor, ingredient-storage area was increased 30 percent. And greater output was obtained by setting up a special revolving pick-off or sorting table and an enclosed cooler adjacent to the bread slicers and wrappers.

Related operations have been consolidated for greater efficiency. For example, the ingredient-scaling operation, originally on the third floor, has been moved to the second floor, where it is performed next to the mixers. In addition, the entire sponge-fermenting process, formerly spread between the second and third floors, is now carried out only on the second floor.

## "Closing Up the Ranks" On the Sponge-Making Job



**NOW FED** by conveyor from floor right below, flour is automatically scaled (above) into sponge mixer.



**FERMENTATION** is no longer spread out between two floors. It now takes place in this room next to mixers.

**SPECIAL HOIST** simplifies job of unloading 650-lb. batch of fermented sponge from trough into dough mixers.

After these changes were made, the plant's fourth floor was torn down and the structure was refinished, greatly enhancing the appearance of the bakery. And the third floor now has been rebuilt for use of the workers—with modern dressing facilities, showers, lunch and recreation rooms.

Increasing the productive capacity of the bakery also necessitated centering the bread-making operations around the new second-floor mixing department. After careful study, distance of product travel was shortened by installing the fermentation room, divider, loaf rounder, proofers, molders, and oven adjacent to the sponge and dough mixers. Formerly, operations involving these facilities were carried out on two floors instead of the present one floor.

Because of differences in the floor level, it was necessary to retain the overhead-trolley system of transporting dough troughs. But the heavy manual labor required to return the sponge into the dough mixer was eliminated by devising a special trough hoist.

In the old set-up, when mixing and fermentation were carried out in the same rooms, dough fermentation was not entirely satisfactory. Vibration created by the old mixers and heat generated by the motors adversely affected fermentation. Now, these conditions have been corrected by confining fermentation in a separate room.

### Changes Made to Get Uniformity

To achieve greater consistency in quality, President Gerard R. Williams initiated several other changes in the plant.

By enlarging storage space, the bakery now can age its flour 3 to 5 weeks. Thus, by using a mellower flour, a more uniform, better-quality bread can be baked.

Other engineering changes associated with uniformity of quality were the installation of two new 75-bbl. sanitary-steel flour bins on the first floor and up-to-date vibrating sifters. With these new highly sanitary bins, flour contamination is at a minimum. The sifters will screen any extraneous matter from the flour.

Flour is now received in multi-wall paper bags, hence moisture and contamination can be further minimized. Moreover, "invisible" flour losses are diminished. And of course there is no longer any need to salvage cloth sacks.

As a result of installing automatic flour-handling equipment, repeated, laborious manual transporting of flour is "out". Equally important, contamination is further reduced, scaling of the flour into mixers is more accurate, and the lots of flour are more uniformly blended. The new flour-handling equipment is easy to get at, hence cleaning of parts is facilitated, and it is done more frequently.

To assure accurate measurement into the mixers of the two large-volume ingredients—flour and water—traveling electrically controlled scales and water meters have been provided. These devices are pre-set to measure predetermined quantities. Thus, the human-error factor is eliminated in the weighing of these materials.

Uniform-quality sponges and doughs are made in modern mixers—high-speed, water-jacketed, temperature-controlled units designed to maintain sponges and doughs at a constant temperature during mixing. They are also designed for highest sanitation during operation. And they are easy to clean after the day's mixing is done.

The fermentation process takes place in an insulated, thermostatically-controlled room, where the temperature during fermentation can fluctuate only a few degrees. And humidification is achieved by confining moisture and gases of fermentation in the enclosed room.

Installation of a 150-ft. conveyor-chute for the bread results in partial cooling of the product—first step in curbing bread-mold. Rapid cooling in an air-conditioned room puts the final damper on molding.

By installing the revolving pick-off table, damage to loaves of bread has been eliminated. Instead of the loaves piling up—as they did on the old, stationary table—the bread is now carried by the new table without colliding.

### Bakery a Showplace

Because of better working conditions, employees now take more pride in their work, which promotes the safeguarding of quality and cleanliness in the bakery. These improved conditions were the direct outcome of modernization. Emphasis was placed upon good lighting and reduction of worker fatigue. And extensive use of white paint gives the plant an "antiseptic atmosphere".

The modernization program also converted the plant into a showplace. And now the company encourages visits by civic clubs, school groups, and other organizations.

To find out how the operations proceed in this model bread-baking plant, let us take a quick "trip" through it:

Flour is delivered to the plant in 100-lb. paper bags in box cars or trailers. Portable roller conveyors, set up in the cars or trailers, carry the bags from unloading dock into the bakery, where they are stacked on lift skids holding 5,000 lb. Electric lift trucks transport these skids to the first-floor storage area. Other ingredients such as sugar, milk, malt and salt are handled in the same way.

First step in bread-making is to prepare the flour before mixing it with other ingredients. Different lots of flour are mixed in an automatic blender to get uniformity. This unit also sifts and aerates the flour.

### How Blender Works

Flours can be blended according to any desired ratio, merely by varying the speed of one of the two blending worm-screws. This is done by a dial adjustment.

After this operation, a bucket elevator takes the blend from the main worm-screw, lifts it about 15-ft., and discharges it through a vibrating sifter into the two 75-bbl. steel storage bins. Worm-screws at the bottom of the two bins carry the flour, as needed, to another bucket elevator that moves the blend to the second-floor mixing department.

At this point, the flour again is sifted and aerated before it is automatically weighed, by an electrically controlled scale, into the flour-scale hopper. Set on an overhead trolley, this hopper can be easily rolled from one mixer to another.

After the correct amount of flour is weighed into the stainless steel mixers, water is metered into them. Hot and cold water feed into one pipe from two lines, regulated so that the temperature of the water flowing into the mixers is about 50 deg. F. City water temperature varies from 36 to 68 deg. F.

Skid loads of other ingredients—salt, sugar, milk, and malt—are brought up to the mixing department by lift-truck via the freight elevator. These ingredients are hand-weighed by a scaling man, then introduced into the mixers, together with yeast and vitamin-mineral enrichment materials.

Depending upon the type of bread being made, the ingredients are mixed 4 to 7 minutes into a 650-lb. batch of sponge. The mixer operates at 50 rpm.

Because constant mixing temperature (76 deg. F.) is so important to the quality of the final product, mixers are water-jacketed. In addition, recording thermometers on the faces of the mixers aid the operator in con-

## New Pick-Off Unit Saves Work, Raises Efficiency

**REPLACING** former stationary table, this revolving one averts bread "piling" and loaves of bread go to cooler faster.

trolling temperatures during mixing.

Once the sponge is ready, the mixer is tilted and it is unloaded into metal troughs. Carried by overhead trolleys, these troughs are pushed into a 35 x 45-ft. fermentation room, which holds 21 troughs.

### Fermentation Controlled

Built on the cabinet- or closed-type principle—the new large fermentation room is thermostatically controlled to maintain temperatures in the 78-to-80 deg. F. range. Formerly, the fermentation operation was split—part of it done on two different floors. The new room has been designed to reduce the bumping that the troughs formerly received due to heavy traffic. And by cutting down on bumping, fermentation is undisturbed.

There are two other advantages—prevention of drying or crusting of the surface of the dough, and reduction in bread-molding with use of a mold-preventive paint on the inner walls.

Aside from functioning better than the former open-room fermentation system, the room is also an attractive showspot of the bakery. Fluorescent lighting strips have been fitted around the inside walls of the room. And three large Thermopane, picture-type windows make the entire room visible while at the same time maintaining proper insulation.

After 3¼ to 4½ hours of fermentation, troughs are rolled out of the room back to the mixing department. A hoist lifts each trough above the mixer and the sponge is dumped into the unit. Next, flour and water are automatically scaled and metered into the mixer. Sugar, salt, milk, shortening and other materials are then added.

The dough mixer runs at a speed of 70 rpm. Here ingredients are mixed with the sponge for 7 to 10 min., again depending upon the type of bread being made.

Dough is then dumped into troughs, which are carried by overhead trolley to the make-up room. An electric lift raises the trough to fill the hopper that feeds the dough divider. This unit cuts dough 4 units at a time, making 40 equal-size units a minute. Dough pieces are then deposited on a canvas-belt conveyor, which is covered with flour sifted at the end of the divider.

### Make-Up Operations

From the divider, the small pieces of dough go to the loaf rounder. Entering this corrugated, conical unit, each piece of dough makes one revolution and emerges as a ball.

The balls of dough are now chuted to a unit which automatically spaces them out, prior to being deposited on the canvas belt that travels back and forth through the preliminary proofer.

Dough is proofed (given an opportunity to rise and become lighter) until it doubles in volume. This proofing softens the dough before it is shaped. The length and speed of the proofer belt are regulated so that the dough emerges in 8 to 10 minutes. This short proof is accomplished in a cabinet that is free from drafts and temperature changes.

The dough is now dumped, by a tilting device, onto a canvas belt and carried to the molder, which forms it into "loaves" at the rate of 3,000 an hour.

At this stage the dough goes into pans, that are loaded onto racks holding 200 pans each. Hanging from overhead trolleys, the racks are pushed into the final- or "wet"-proofing room. Temperature of this room is 96 deg. F., and the relative humidity is over 90 percent. Dough is proofed 60 to min. to raise it to the shape of a lo of bread.

Next step is baking. Racks a taken out of the proofer and moved a 48-tray dual-lap oven. Pans dough are hand-loaded into the 40- coal-fired oven, and they make fo "passes". The oven temperature controlled at 460 deg. F. by an ele tronic controller located in each of th four pass areas of the oven. The are also three control instruments o the side of the oven to regulate tem peratures in the different zones.

### Handling the Baked Bread

As the pans are taken out of th oven, the bread is dumped onto a bel conveyor, empty pans returning to th greasing and panning station. Th 150-ft. conveyor takes the bread to stainless-steel, spiral chute. There i partial cooling of the bread during thi travel.

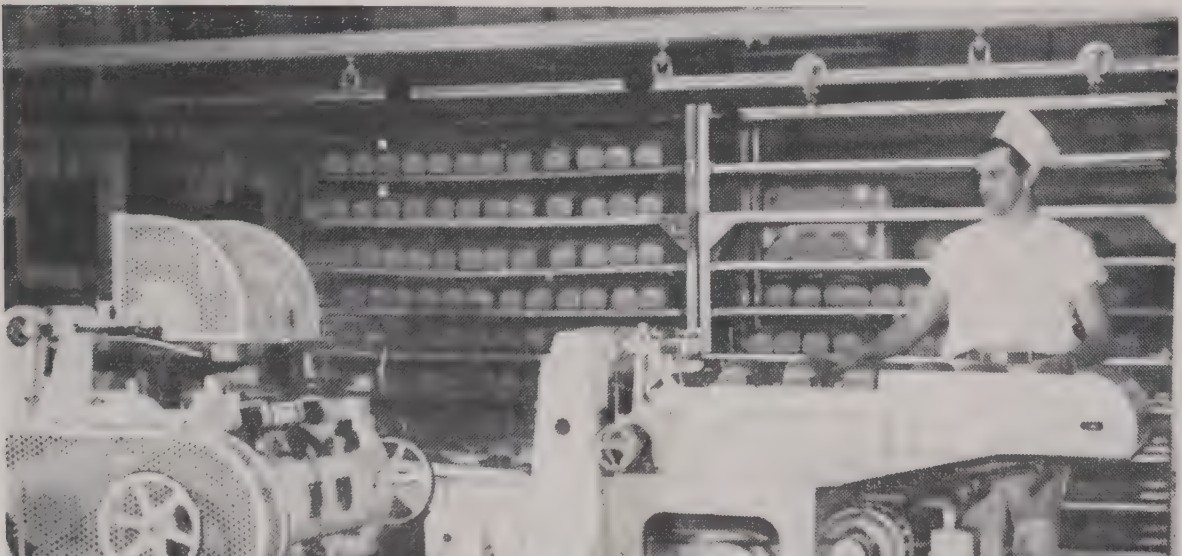
From the spiral chute, the brea slides onto a specially constructe bread-sorting table, 2½ ft. wide by 18 ft. long. The bread revolves around this oblong table on a merry-go-'round type, maple-slotted conveyor (see photo).

Bread is sorted from the table and loaded onto racks that are pushed via overhead trolley to the cooling room. This 87-ft. room cools the bread from about 200 to 90 deg. F. in about 85 minutes. The former method—cooling the bread at room temperature—took too long. And during the summer months the bread sometimes molded.

Emerging from the cooler, which holds 18 racks, bread is automatically sliced and then machine-wrapped with a single layer of waxed paper. A canvas-belt conveyor then carries the bread into the 250-ft.-long shipping department. Here, bread is packed 25 loaves to a box.

These boxes are specially constructed so that they can be stacked on top of each other without crushing the loaves. And when emptied, the route salesmen can collapse them, since they are hinged at the four corners. Thus, the salesmen have more room to work their load, without being required to unload and reload some of their items at every stop.

Adjoining the shipping room is the garage, which is laid out so that 30 route trucks can be loaded at the same time. Further, there is no interference with the activities at the far end of the shipping department, where the four Williams trailers are loaded with bulk commodities to be delivered to company bakeries at Wilkes Barre, Pa., and Newburgh, N. Y., and also to sales branches in various cities in Pennsylvania, New Jersey, and New York.



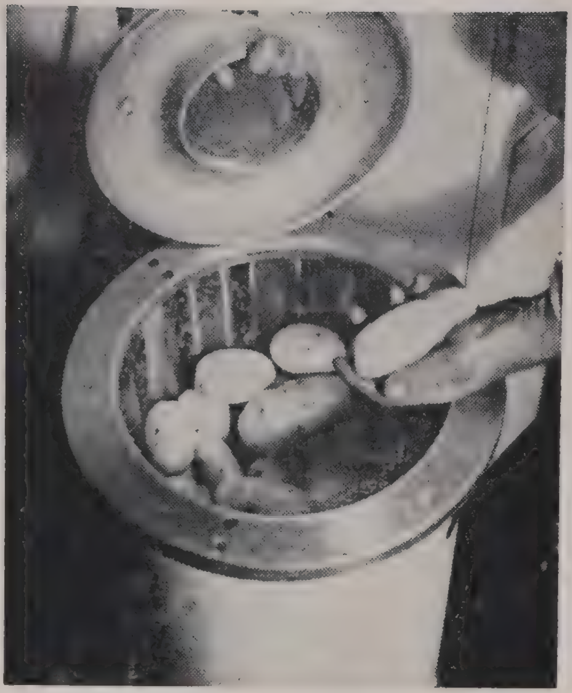
**BY RELOCATING** bread slicing and wrapping machines (above) next to the first-floor cooler, the ingredient-storage area was increased 30 percent.

# Tests Show Which Potatoes Have Least Peeling Loss

Processors can avoid much waste by selecting the right varieties from the best sources and then properly timing operation of abrasive peelers

**R. C. WRIGHT and T. M. WHITEMAN**

Respectively, physiologist and associate horticulturist, Division of Fruit & Vegetable Crops & Diseases, Bureau of Plant Industry, Soils & Agricultural Engineering, Agricultural Research Administration, USDA, Beltsville, Md.



CAREFUL experiments with abrasive peeler provide practical data for the guidance of processors.

How much waste results from peeling potatoes in mechanical abrasive peelers? What varieties give the least waste? How long should potatoes be kept in the peelers for best results?

To find some of the answers to these practical questions, the authors made peeling tests with several varieties from different producing areas.

The results show considerable difference between varieties, as well as between lots of the same varieties from different sources. But generally speaking, the best results were shown for: Sebago (from Maine, Wisconsin, Washington), Russet Rurals (Pennsylvania, Michigan) and Katahdins (from Maine, Pennsylvania, Colorado). These have the least percentage of loss from peeling.

Tests were made with a small motor-driven abrasive peeler of 10 to 20-lb. capacity. It has an inside wall of widely corrugated polished aluminum and a 10½-in. revolving abrasive disk base with two radial, rounded ridges 1½ in. high. These ridges tend to toss the potatoes and keep them revolving while the skins are scarified and then washed away by a stream of water.

### Samples in Peeler for 2 Min.

In the first test, 10-lb. samples from 25 lots of potatoes were studied after 2 months' storage at 55 deg. F. There were nine different varieties, each from two or three production areas. Samples were selected for uniformity in size and freedom from unnatural blemishes. To get a direct comparison between varieties, all lots were run in duplicate for a uniform period of 2 min. This time was selected because a series of trial runs indicated it to be about the average required for the most difficult lots. In all cases, the peel was entirely removed except in the eye cavities and other depressions. Samples were weighed before peeling and afterward—as soon as they had drained. Results are shown in Table I.

Although this data gave comparative results between varieties, it seemed desirable to make another test in which each sample was in the machine just long enough to remove the peel. Such a test was made in duplicate the following year.

The same varieties, except White Rose, again were used. However, not all of the lots tested were from the same sources as in the previous year. In most cases, three or four lots of each variety were used.

### Peeling Time Recorded in Second Test

Ten-pound samples were selected from stock held at 55 deg. F. for about a month. The potatoes were left in the peeler until most of the peel was removed. Then they were carefully hand trimmed to remove the eyes and clean out cavities or depressions not touched by the machine. Time required for peeling was recorded, as well as the weight after peeling and after hand trimming. Results are presented in Table II.

Both of these tests showed the greatest peeling loss for the Irish Cobbler

(*Turn to page* 192)

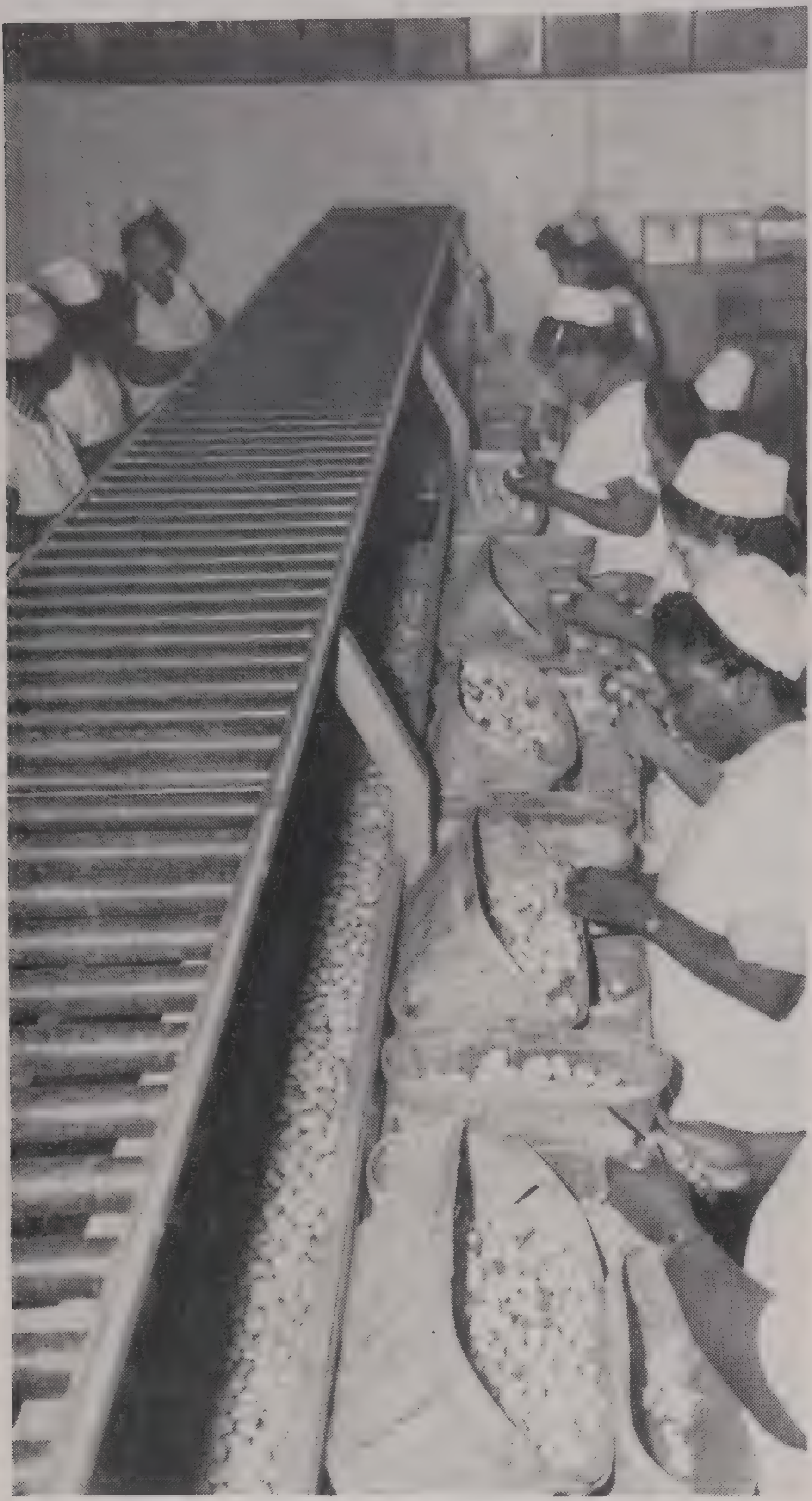
TABLE I—Peeling Losses of Potatoes After 2-Min. Run

| Variety | Source | Percent Loss | Average Percent Loss |
|---|---|---|---|
| Russet Rural | Mich | 14.0 | 14.0 |
| Russet Rural | Pa | 15.0 | |
| Sebago | Wis | 11.0 | 15.2 |
| Sebago | Wash | 12.5 | |
| Sebago | Me | 22.0 | |
| Katahdin | Col | 17.5 | 20.0 |
| Katahdin | Pa | 20.0 | |
| Katahdin | Me | 22.5 | |
| Russet Burbank | Wash | 22.0 | 23.2 |
| Russet Burbank | Idaho | 22.5 | |
| Russet Burbank | Calif | 25.0 | |
| Chippewa | Me | 24.0 | 24.5 |
| Chippewa | Mich | 25.0 | |
| White Rose | Idaho | 23.0 | 26.2 |
| White Rose | Calif | 27.0 | |
| White Rose | Wash | 28.5 | |
| Triumph | N. D | 25.0 | 29.7 |
| Triumph | Neb | 28.0 | |
| Triumph | Col | 35.0 | |
| Irish Cobbler | Long Island | 25.0 | 30.0 |
| Irish Cobbler | Wis | 28.0 | |
| Irish Cobbler | Me | 37.0 | |
| Green Mountain | Long Island | 21.0 | 31.3 |
| Green Mountain | Me | 36.0 | |
| Green Mountain | Me | 37.0 | |

TABLE II—Peeling and Trimming Losses With Minimum Peeling Time.

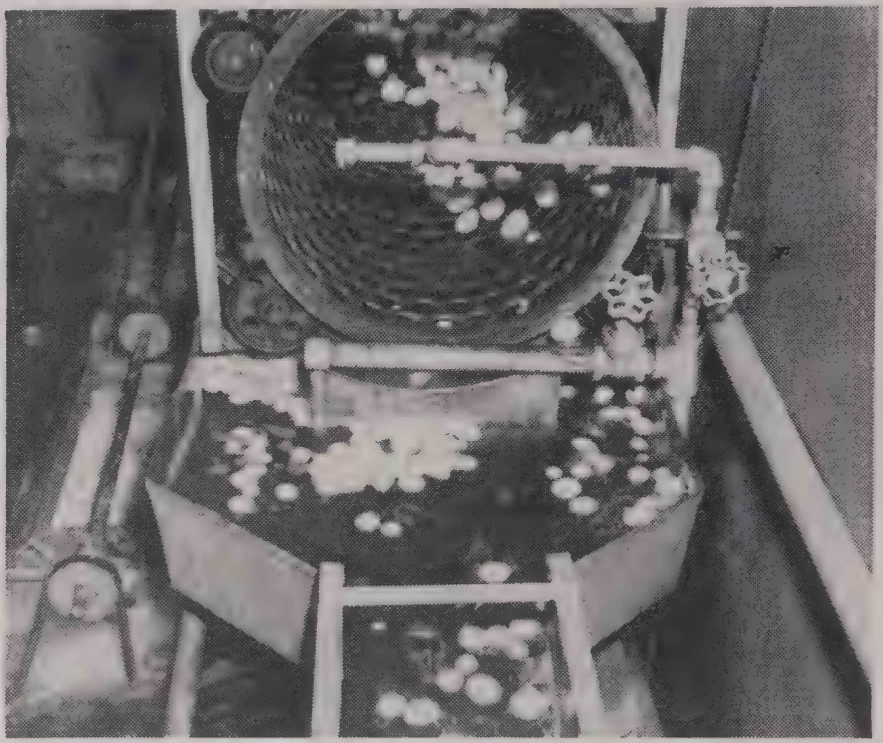
| Variety | Source | Percent Peeling Loss | Percent Loss After Trimming | Peeling Time Min.-Sec. |
|---|---|---|---|---|
| Sebago | Wis | 7.0 | 8.0 | 1–20 |
| Russet Rural | Pa. (Lehigh Co.) | 8.0 | 10.0 | 1–20 |
| Russet Rural | Pa. (Lancaster Co.) | 9.0 | 10.0 | 1–20 |
| Katahdin | Me | 9.5 | 11.0 | 1–10 |
| Katahdin | Pa | 9.5 | 11.0 | 1–20 |
| Katahdin | Col | 7.5 | 9.5 | 1–30 |
| | Av. | 8.8 | 10.5 | 1–20 |
| Russet Burbank | Idaho (dry land) | 12.5 | 14.5 | 1–45 |
| Russet Burbank | Idaho (irrigated) | 12.5 | 15.0 | 1–20 |
| Russet Burbank | Wash | 14.0 | 16.0 | 1–27 |
| | Av. | 13.0 | 15.2 | 1–31 |
| Triumph | N. D. (heavy soil) | 15.5 | 19.5 | 1–37 |
| Triumph | N. D. (light soil) | 9.0 | 12.0 | 1–15 |
| | Av. | 12.2 | 15.7 | 1–26 |
| Chippewa | Me | 13.5 | 15.5 | 1–2 |
| Chippewa | Ind | 15.0 | 17.0 | 1–5 |
| Green Mountain | Me. (heavy soil) | 17.0 | 20.0 | 1–27 |
| Green Mountain | Me. (light soil) | 22.5 | 24.5 | 1–35 |
| Green Mountain | Long Island | 16.0 | 17.0 | 1–20 |
| | Av. | 18.5 | 20.5 | 1–27 |
| Irish Cobbler | Me | 22.0 | 24.5 | 1–15 |
| Irish Cobbler | Wis | 19.0 | 21.5 | 1–15 |
| Irish Cobbler | N. D. (heavy soil) | 18.5 | 20.5 | 1–30 |
| Irish Cobbler | N. D. (light soil) | 15.0 | 18.0 | 1–12 |
| | Av. | 18.6 | 21.1 | 1–18 |

## Camera Shots Along Process Line — Cutting to Canning



**1** **GIRLS** cut buttons into one basket, pieces into another. Flume to wash is seen under basket conveyor.

**2** "**GOING AND COMING**" channels for button-washing are seen on right, for pieces-washing on left.



**3** **GRADER** separates buttons into small and large sizes. Small sizes are flumed (foreground) for regrading.

# Canned-Mushroom Quality—What It Takes

Called for, after "know-how-plus" cultivation, are advanced processing technics well punctuated with careful production-line inspections

**JOHN V. ZIEMBA**
Assistant Editor, "Food Industries"

Getting quality mushrooms — and more of them—for a profitable canned pack is a complex job any way you look at it.

But Brandywine Mushroom Corp., West Chester, Pa., may be particularly noted as one company that is no longer stumped by questions of quality. It learned to grow its own mushrooms the scientific way, and it followed up with advanced processing practices.

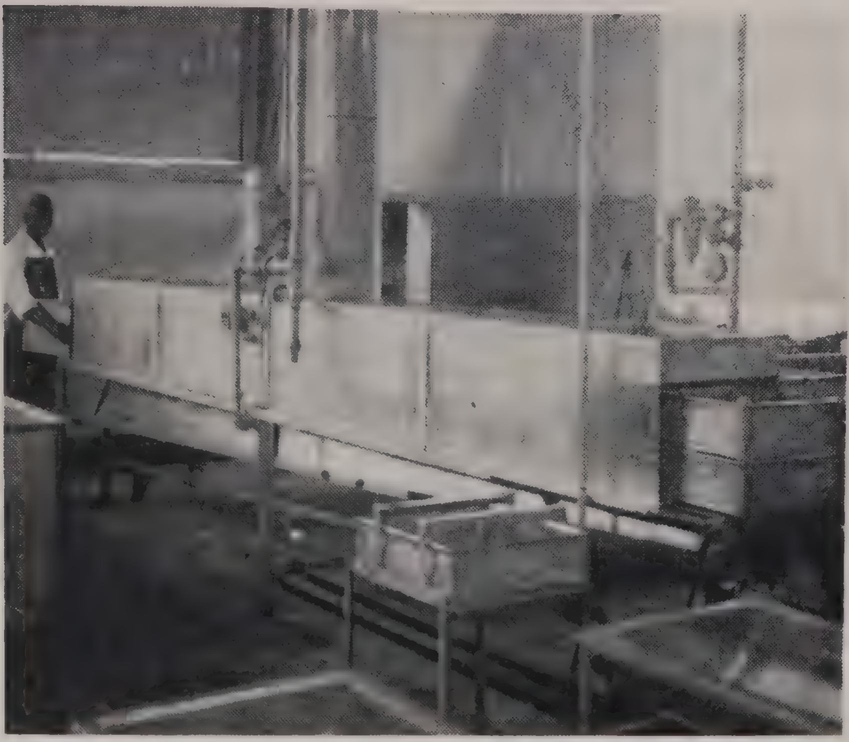
In addition, a running check is constantly maintained by a thorough inspection system set up at five salient points along the production line. In short, these operators "know their mushrooms from seed to button."

Production was raised by applying scientific practices to mushroom cultivation and to the control of insect infestation and mushroom diseases. Installation of air conditioning units in growing houses also "upped" output by enabling cultivation of an additional crop.

Key to cultivating quality mushrooms is the use of specially constructed growing houses, insulated against extreme heat and cold. Temperature and humidity conditions in these houses are controlled for best culture of these tasty fungi in the rich-humus beds. The humus is inoculated only with

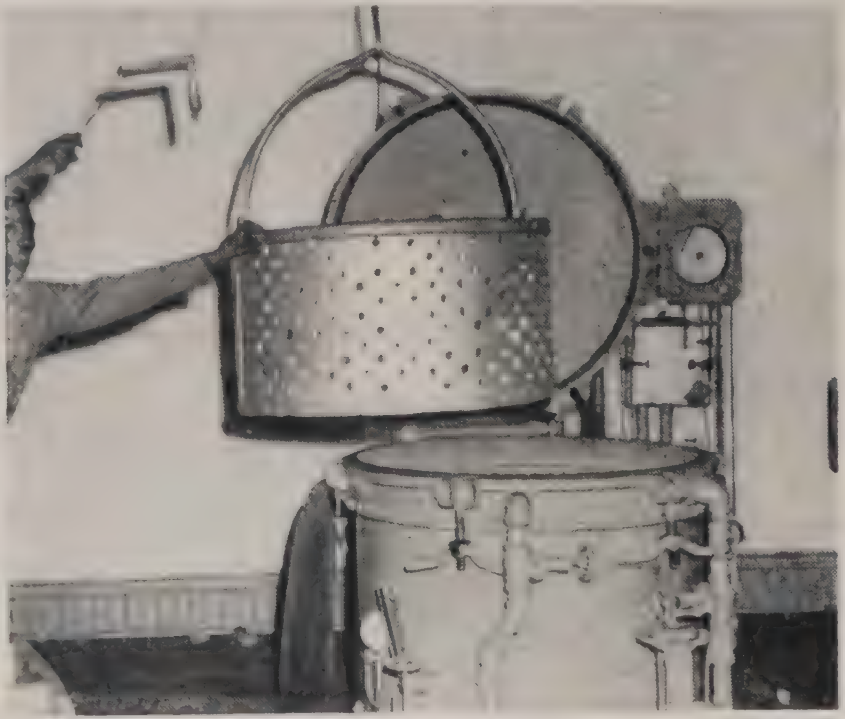
For quick picture of growing, turn page →

**4** **METAL BINS** where eight different size buttons are collected. Here, buttons are rewashed and inspected.



**5** **CONTINUOUS** steam blancher preshrinks buttons so they can be packed to the proper drained weight.

**6** **WITH** button uniformity achieved through grading and inspection, filling and weighing are simplified.



**7** **HEAT-PROCESSED** in retort, load of canned product is now set to go to automatic labeler.

scientifically propagated mushroom spawn or "seed" to eliminate the chances of "wrong type" mushrooms.

By exercising extreme care during cultivation, the grower minimizes the possibilities of a poor quality crop. Care is the insurance that keeps out mushrooms that are light in weight, of spongy texture, or easily susceptible to diseases.

A further tactic to assure the cannery of top quality raw stock is correct timing in picking. By gathering the buttons at the right stage of growth, a maximum amount of fancy quality raw material will then be available for the cannery. Naturally, the better they are, the less the amount of inspection required.

Pickers must be trained to gather mushrooms while they are slightly immature, or when the veil is still firm. Only those are selected that are free from spots and blemishes.

The Brandywine cannery insists that the mushrooms be picked with the root on—i.e., the butt end is not cut off on the bed, as is the practice for those shipped to the fresh market. Reason for the root-on practice is that freshness is thus further retained.

Immediately after the mushrooms have been gathered—in 10-lb. wooden baskets—they are rushed from the growing houses to the cannery. Here, the receiving department makes the first inspection.

If the cannery temporarily is overstocked with mushrooms, the new loads are held in a high-humidity refrigerated room (34–36 deg. F.). But under no condition are mushrooms kept over a few hours in this room. In addition to retaining freshness, this method avoids cluttering of the cutting department with large stocks of fresh-picked mushrooms.

The cutting department has four 35-ft. cutting tables, with 30 girls to a table. From a roller conveyor that moves above each table (see first photo), the girls take baskets of mushrooms. Each girl also is supplied with two empty baskets, one for buttons and the other for stems and cut pieces of mature mushrooms.

### Preparing the Buttons

Cutting proceeds in this way: First, the root of the mushroom is removed and discarded into a waste receptacle. Next, a portion of the stem is cut off fairly close to the cap. And while the girls are cutting, they also inspect the mushrooms—the second inspection. Buttons are put into one basket and stems and pieces are put in another. Finally, when the baskets are full, head inspectors look over the baskets.

Most important factor in maintaining quality has been the installation of three series of flumes. These convey mushrooms from cutting tables through the flume-washers and then to the graders. And during this travel, all extraneous matter is washed from the product.

This fluming has also eliminated the bruises and other damage which commonly occurred when other methods of handling were employed.

One series of flumes carries the mushrooms from the cutting tables to the second series—the washing flumes. The third series conveys them to the graders.

Flumes at the cutting table and rewasher comprise channels that are 12 in. deep by 6 in. wide. Through them, 8-in.-deep streams of water flow at a moderate rate.

Initially, the cut mushrooms that pass inspection at the cutting tables are dumped into the first of the three flume systems. This first series of three parallel channels carries the mushrooms along the center of the cutting tables. The center channel is for the stems and pieces, and the two outside channels are for buttons. Three sets of water sprays play on the cut mushrooms.

Flowing away from the tables, the mushrooms discharge into the second series comprising 50-ft. loops, placed laterally. Here, there are six sets of water sprays.

In operation, the two channels of buttons flow into the first lateral flume, and the single channel of stems and pieces discharges into the second lateral flume. In the course of the subsequent travel, through the 50-ft. loops, the mushrooms get a thorough washing.

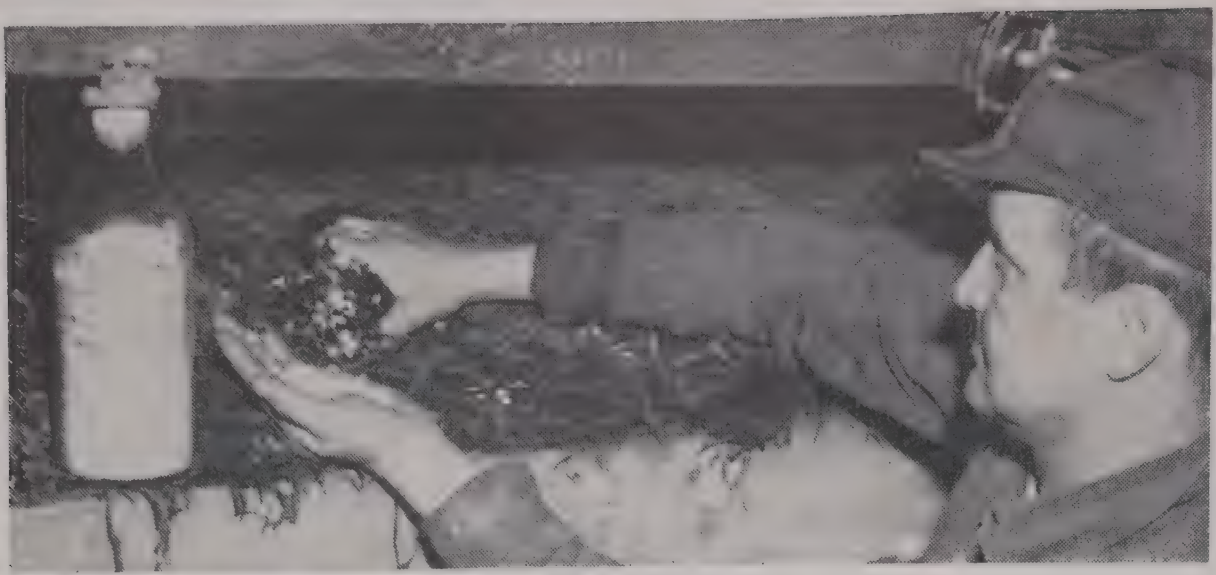
### Buttons Carefully Graded

Leaving the washing flumes, stems and pieces go to a 300-gal. stainless-steel collection tank for the fourth inspection prior to blanching. Meantime, the buttons are elevated (by a wire-mesh belt on which angle-iron cross pieces are attached at intervals to help them along) up to a revolving gravity grader, where they are separated into three sizes—two different large sizes and one small size.

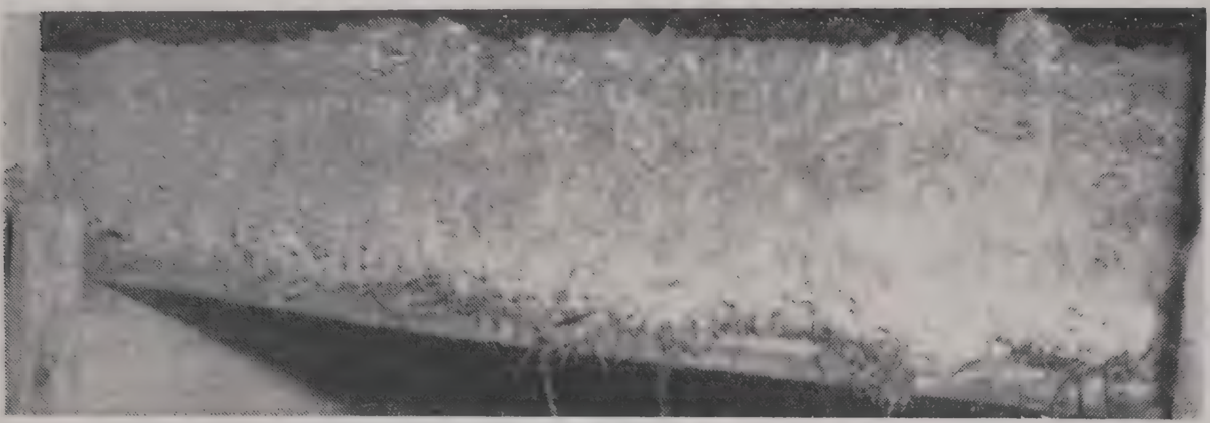
The two streams of large-size buttons are discharged by the third series of flumes into two separate 300-gal. stainless steel-lined collection tanks. From these tanks, they travel through two automatic slicers that cut them into $\frac{3}{8}$-in. pieces at the rate of 1,000 lb. an hour.

The smaller buttons are flumed from the gravity grader to a 30-ft. long and 3-ft. wide revolving flotation grader

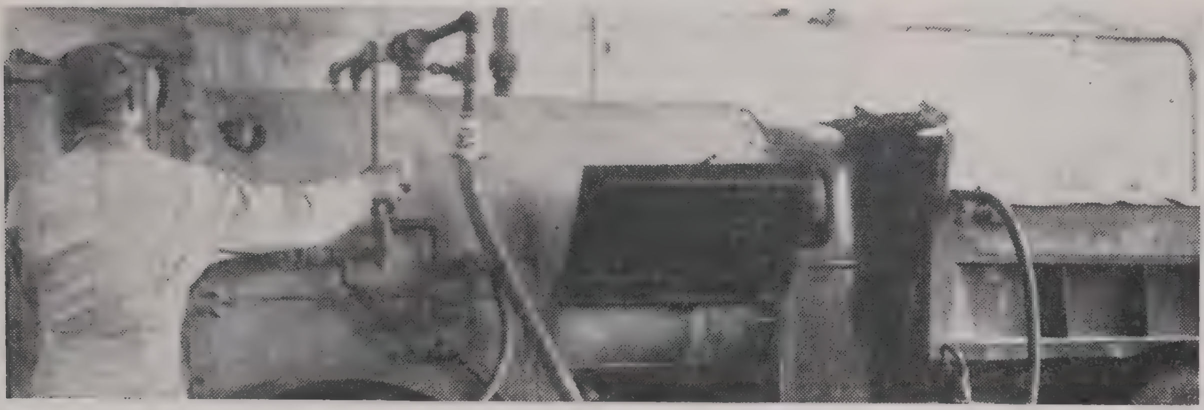
## FROM SEED TO BUTTON



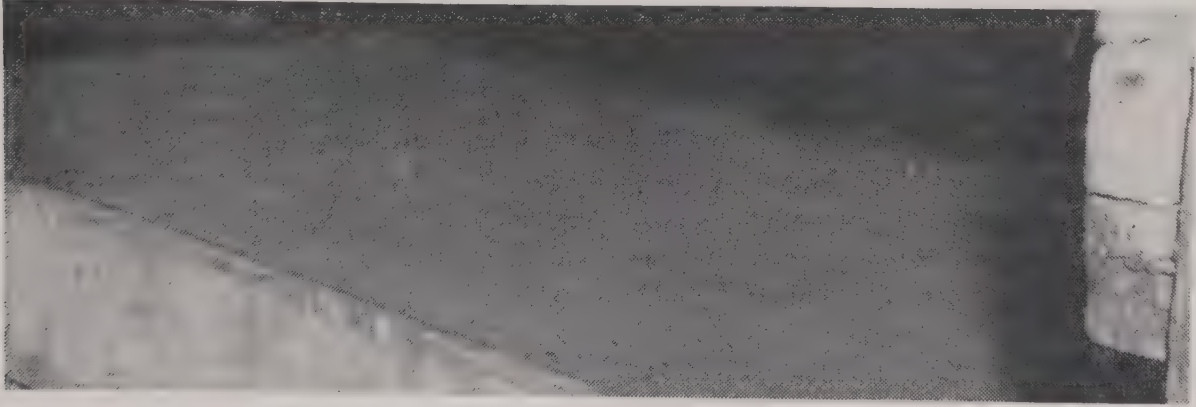
SPAWN (in flask) is spread in humus bed . . .



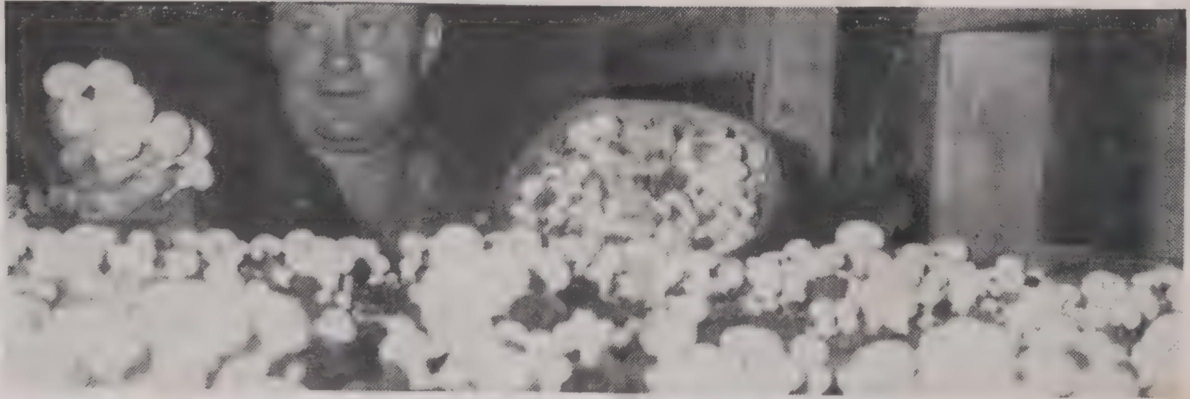
. . . AND grows for three weeks.



NOW, steam-sterilized load of loamy soil . . .



. . . GOES over spawned bed.



THEN three weeks later — the harvest.

—a unit similar to the gravity one, but submerged in water. As the small buttons float upward through this grader, which revolves at about 20 rpm., they pass through apertures of varying diameters and are thus separated into six different sizes. The water buoys the buttons gently through the grading apertures. Each size is next flumed to collection tanks, where they, too, get a fourth inspection before blanching.

Installation of the submerged, or "buoyancy", grader was another change made to augment quality of whole-button mushrooms. This unit aids quality in two ways—by minimizing bruises during grading, and by separating the mushrooms into lots of six different sizes, thus enabling selection of uniform-size buttons when packing in cans.

Quality has been still further protected through installation of a continuous, automatic steam-blancher. Aside from destroying enzymes that cause discoloration, this unit also preshrinks the mushrooms so that, when packed in cans, they will have the proper drained weight.

The improvement lies in the fact that, in comparison with the former hot-water batch system, the continuous method is both faster and easier, and the mushrooms more uniformly blanched.

This automatic unit consists of a chain conveyor enclosed in a stainless steel box. Inside are eight sets of perforated steam pipes—four above and four below the conveyor, spaced about 6 ft. apart. By this arrangement, live steam is distributed uniformly throughout the blancher. The conveyor is geared to travel 26 ft. in 6 min., a rate gaged to assure a complete and uniform blanch.

Mushrooms of all types are conveyed through the blancher in perforated, self-draining Monel baskets.

Baskets coming from the discharge end of the blancher go into stainless-steel troughs adjacent to the scales at each weighing station. Here, girls further inspect the mushrooms as they fill and weigh them by hand into 2-, 4-, and 8-oz. cans. Next, a salt tablet is automatically added and the cans are then processed in retorts at 240 deg. F. Finally, the cans are automatically labeled. An electric eye will automatically stop the labeler in event the flow of finished cans is blocked at the discharge end.

To give the cans attractiveness and create impulse buying, the company employs a special laminated foil label, printed in black and gold.

Average poundage was greatly increased and chances of crop failures were reduced through the company's painstaking development of "know-how-plus" in cultivation. There has been constant attention to the job of maintaining the proper conditions essential for quality mushroom growth, with care at all times in the control of insects and diseases.

Production at the plant also has been raised by the addition of 16 new mushroom growing houses. These have increased the growing beds an additional 192,000 sq. ft., enough for a plant total of about 300,000 lb. of mushrooms per crop. The double houses have four rows of growing beds, each seven tiers high.

Installation of two automatic air conditioning units for the new growing houses enables production of an additional crop during the hot and humid summer months, thus leveling out canning operations. Previously, only two crops could be raised.

Two compressors, each of 20-ton capacity, cool the houses. Refrigerated air is blown in through one set of ducts and returned via another set. Provision also is made to introduce a small amount of outside air, which is essential during the growing period.

### A 7-Step Science

It should be pointed out that modern mushroom culture is a far cry from the old "cave man" methods of France and the greenhouse growing technics of England. In view of the present-day needs, high yield of quality mushrooms demands a scientific approach to mushroom cultivation, to sanitation, and to the prevention and control of insect pests and diseases.

The seven steps in modern commercial mushroom culture, under the most sanitary conditions, may briefly be listed as follows—

*First step* is to make a compost: Allow fresh horse manure to ferment or decompose for two or three weeks. Products of this decomposition are essential for the growth of the fungi.

*Second,* the growing beds are prepared. The bed-sections are thoroughly scraped, cleaned, and scrubbed with wire brushes. Before the beds are filled with compost, the houses are sprayed with a suitable disinfectant. As an added precaution, these houses also are fumigated.

*Third,* after the beds have been prepared, they are filled with 6 in. of compost. Care is exercised in spreading compost evenly throughout beds.

*Fourth,* the beds then undergo a 7-14-day sweating-out process. The growing houses are closed, and the temperature of the beds is allowed to rise slowly and steadily. This process results in chemical changes that make the compost more favorable for the growth of spawn. Too, it kills insects (or brings them to the surface of the beds where they can be easily destroyed), eliminates disease-producing organisms, and maintains proper pH and moisture in the beds.

*Fifth,* when the temperature of the beds drops to about 80 deg. F., the pure mushroom spawn is planted. Only the choicest cultivated mushrooms are selected for the spawn, or seed, from which each new crop of mushrooms is grown. (Trained laboratory technicians pick these choice mushrooms before the veil is broken. Then comes sectioning of the mushrooms. The sections are put in sterile tubes and kept in incubators until the spores drop in the tube. Transferred again under sterile conditions to culture flasks that contain the growing medium, these spores germinate and produce the pure culture spawn.)

*Sixth,* after planting, the spawn grows throughout the compost. Spawning usually takes about three weeks under proper conditions. The moisture, temperature, and ventilation must be just right.

*And seventh,* when the compost alongside the mushroom-bed sideboards is spotted with half-moon shaped spawn, the bed is cased—that is, a $1\frac{1}{4}$-in. layer of sterilized loamy soil is evenly spread over the surface of the compost. Finally, 10 to 14 days later, mushrooms begin to appear on the surface. Mushrooms are ready to be picked in 8 to 10 days.

**GROWING HOUSES** are controlled under right temperature and humidity for cultivating quality mushrooms. Compost piles (left) are handy for making beds.

**PROCESSING LINES** serve both canning and freezing departments in new Adams Apple Products Corp. plant, Aspers, Pa.

# Freezing, Canning Teamed for Efficiency

Dual use of facilities and personnel, large pre-storage room, and conveying with 34 F. water are prime factors. Products also improved, operating costs cut

**A. W. RUFF**
V. C. Patterson & Associates, York, Pa.

Increased flexibility that's brought notable operational advantages has been achieved by executives of the Adams Apple Products Corp. through construction of a new fruit and vegetable processing and freezing plant adjacent to the company's established cannery at Aspers, Pa.

By this move, freezing and canning have been combined into a single setup that affords dual use of facilities. And now, products grown in this region can be processed in either plant—as best suits market conditions.

The resulting benefits are clear-cut:

- The company's operational season has been lengthened to approximately 50 weeks per year. And trained personnel is thus assured steadier employment.
- Key processing lines are now used for both plants.
- Power and steam are employed more economically.
- Pre-storage room, quality control lab and personnel, and well water and waste disposal systems now serve both plants.

Prior to construction of the freezing plant, the following apple products were prepared and canned: Sliced apples, apple sauce, cider, juice, vinegar, butter and pomace. Cherries, tomato juice and tomato pomace were also canned.

Then, with opening of the new facility, the following items were frozen last year: Sliced apples, cherries, raspberries, strawberries, peas, lima beans spinach, broccoli, and fruit pies.

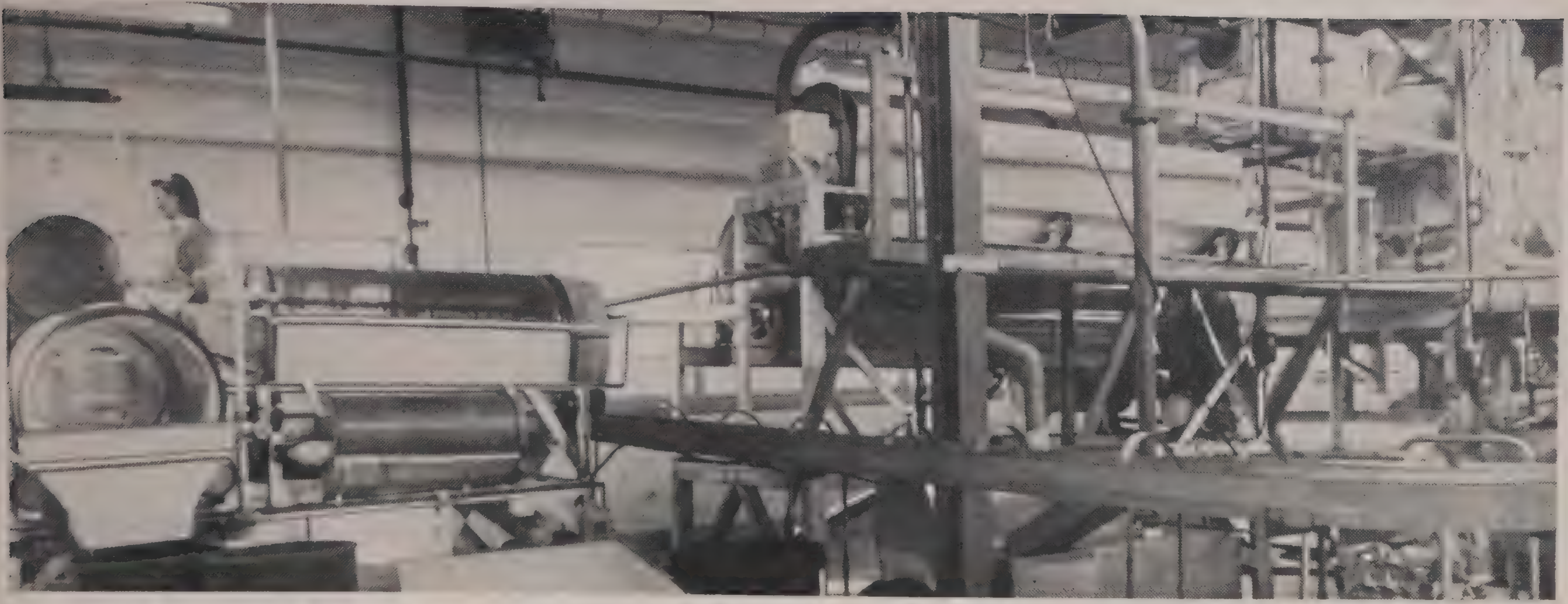
The new plant has an area of approximately 30,000 sq. ft. Of this total, 3,600 sq. ft. are allotted to the 32 F. pre-storage cooler; 4,000 and 1,200, respectively, to main and auxiliary processing rooms; 8,900 to 0 F. storage; and 700 to the —40 F. freezing tunnel. That accounts for 18,400 sq. ft., all told. The remaining space is given to dry storage, office, mechanical equipment and repairs, dressing and wash rooms, and receiving and shipping platforms.

### Plant Has Special Processing Features

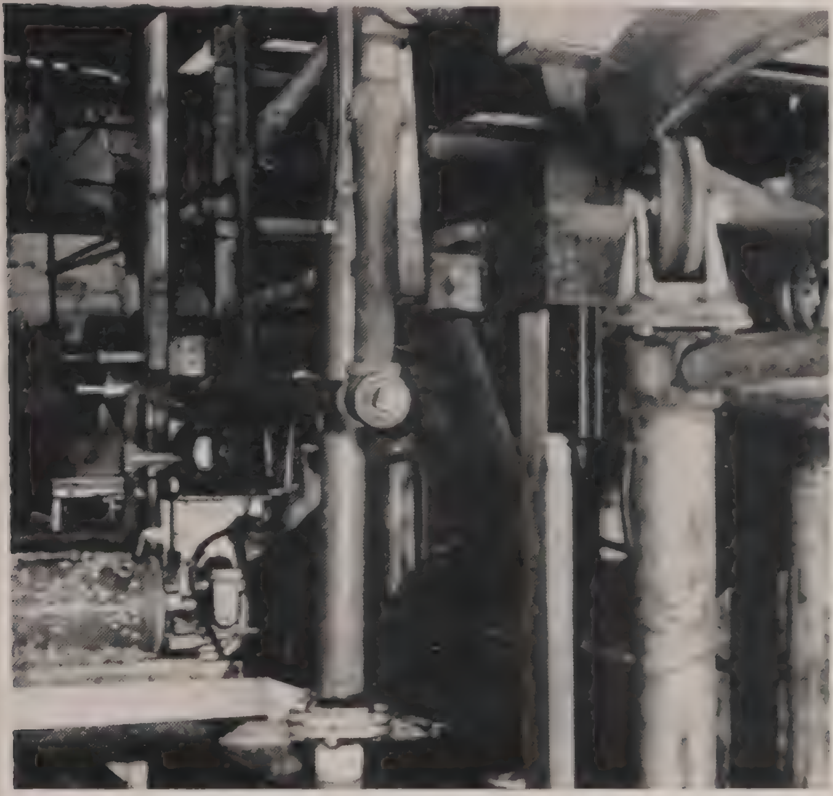
To improve operating efficiency and assure above-average product quality, a number of unusual features were incorporated when the new plant was constructed.

The large 32 F. pre-storage room provides accumulating space to balance receipts against processing operations. For example, peas may now be held up to 60 hr. between vining and processing, as against a previous

# Close-Ups On the Frozen-Product Line



**PRODUCTS FOR FREEZING** are graded, blanched, washed and inspected as in preparation for canning.



**HYDRO-CONVEYOR** (center) gets product (left) and lifts it to freezing tray filler. Base of rotating table is seen right.

**ROD SEPARATOR** (top) dewaters product before it falls into filler hopper preparatory to feeding into trays.

**FILLED TRAYS** are placed on skid that stands on rotating table. Then table is turned 90 degrees . . .

. . . **AND SKID** is picked up by fork truck, which moves it into freezing tunnel. Truck returns with frozen products.

8 to 10 hr.; and lima beans may be held six days, as against the former two.

Sweet water—chilled to 34 F.—is used in the hydro-lift conveyor to move products from picking belts to freezing tray filler (see Fig. 1). This procedure accomplishes three purposes: (1) Reduces load on the freezing tunnel; (2) improves product quality, and (3) increases net weight of end-product.

### Vegetables Batch-Frozen

The freezing tunnel is of the batch type, making possible its operation on the most satisfactory schedule for each product being frozen.

Vegetables are bulk frozen by filling into trays, which are then stacked on special skids and transported by fork-lift truck into the freezing tunnel. When solidly frozen, products are emptied from the trays into a cluster buster that feeds directly into the hopper of a weigh filler.

Fruits are filled directly into large containers, such as 30-lb. tins. These are placed on pallet skids, which are then moved into the freezing tunnel by a fork-lift truck. When frozen, containers of fruit are removed from the freezing tunnel and stored in the zero F. room.

Plant layout was carefully planned for economical control of labor and efficient product handling, using a combination of roller conveyors and pallets. Trucking and railroad platforms serve the entire one-story plant without crossover of in- and out-going traffic.

### Refrigeration

Vertical, multi-cylinder, single-acting ammonia compressors, inter-connected so as to operate either single- or two-stage, comprise the refrigeration system. When used single-stage on the rooms, it is fully automatic. When operating two-stage on the freezing tunnel, the refrigerating system is semi-automatic.

An ammonia-liquid recirculating system handles the liquid feed and control to the 0 F. storage room and the freezing tunnel. The sweet water cooler has a standard low pressure, float-controlled, flooded system, and the pre-storage room is controlled with a two-temperature arrangement using thermal expansion valves.

Capacities in the refrigeration plant are:

| | |
|---|---|
| Pre-storage room | 15 tons |
| Freezer storage | 15 tons |
| Freezing tunnel | 60 tons |
| Sweet water cooler | 20 tons |
| Total | 110 tons |

In engineering the new plant, economy of operation was given great consideration. Here are twelve money-saving features which were incorporated in it:

1. Well water is conserved by re-using it in the plant system after it has passed through the refrigeration condensers.

2. Refrigeration design balance, hook-up, and controls are such as to assure good operation under varying conditions. It is notable that two garage mechanics took over operation without special training, and have run the plant for twelve months without difficulty.

3. Floor heating is employed under cold rooms to prevent ice accumulation, which causes failure of insulation.

4. Tray filling, handling and dumping is arranged to assure efficient and rapid handling of products.

5. Automatic door openers on refrigerated rooms reduce labor and conserve refrigeration.

6. Automatic refrigerant-liquid controls provide positive regulation, and automatic indicators visually record refrigerant condition.

7. Properly engineered hot-gas applications on all refrigeration coils assure easy and quick defrosting. Freezing tunnel coils have been defrosted in about 25 min., cutting to a mere 40 min. the period from time of unit shutdown to resumption of normal operation.

8. Freezing tunnel is located (see Fig. 2) within the 0 F. storage room—conserving refrigeration and prolonging the tunnel's life by avoiding warm-ups, and their accompanying deleterious effects, when the tunnel is not in use.

9. By use of sliding doors, the individual tunnel units can be isolated. This permits defrosting the refrigeration coils serving the unit without interfering with operation of cold diffusers in the other units. It also facilitates repairs to equipment.

10. Electric power bus lines are carried over processing lines so machines can be hooked in conveniently. This

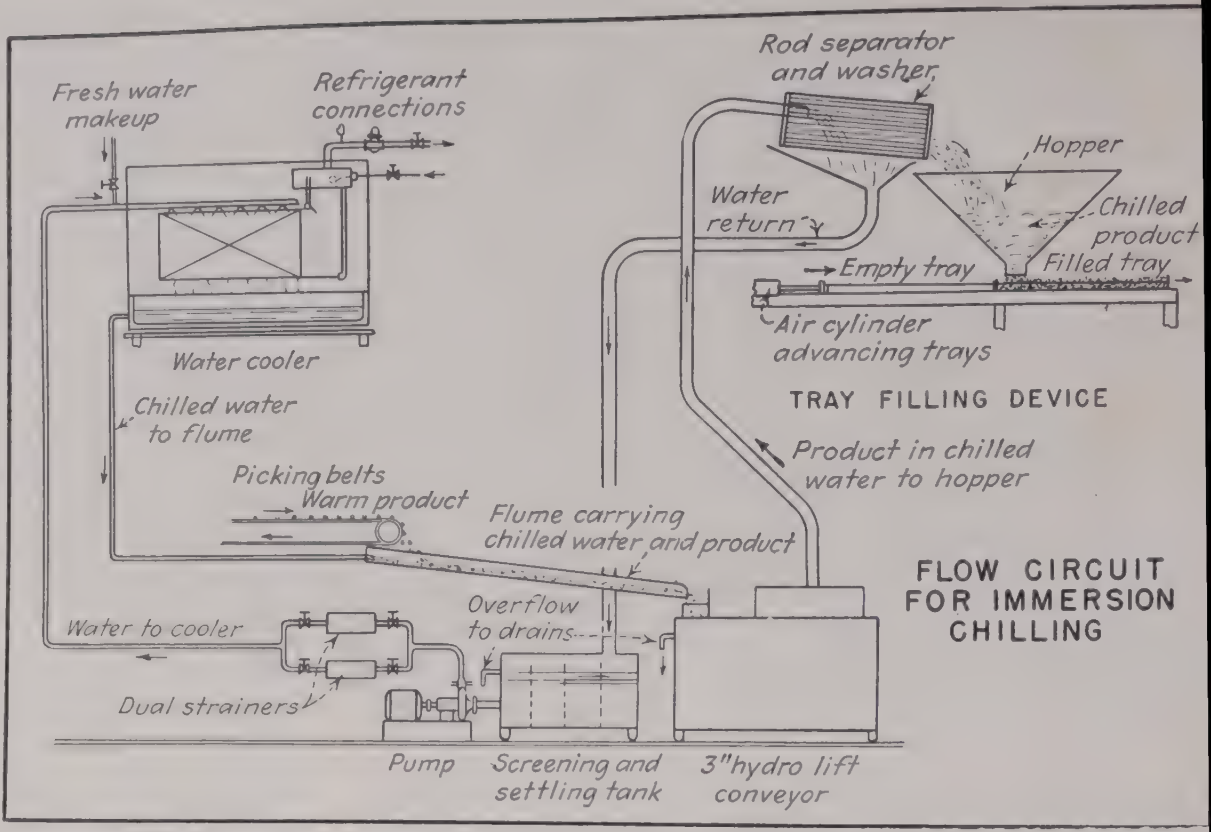

Fresh water makeup
Refrigerant connections
Rod separator and washer
Hopper
Water return
Chilled product
Empty tray
Filled tray
Air cylinder advancing trays
TRAY FILLING DEVICE
Water cooler
Chilled water to flume
Product in chilled water to hopper
Picking belts
Warm product
Flume carrying chilled water and product
FLOW CIRCUIT FOR IMMERSION CHILLING
Water to cooler
Overflow to drains
Dual strainers
Pump
Screening and settling tank
3" hydro lift conveyor

FIG. 1. Products to be frozen are chilled during conveying in 34 F. water.

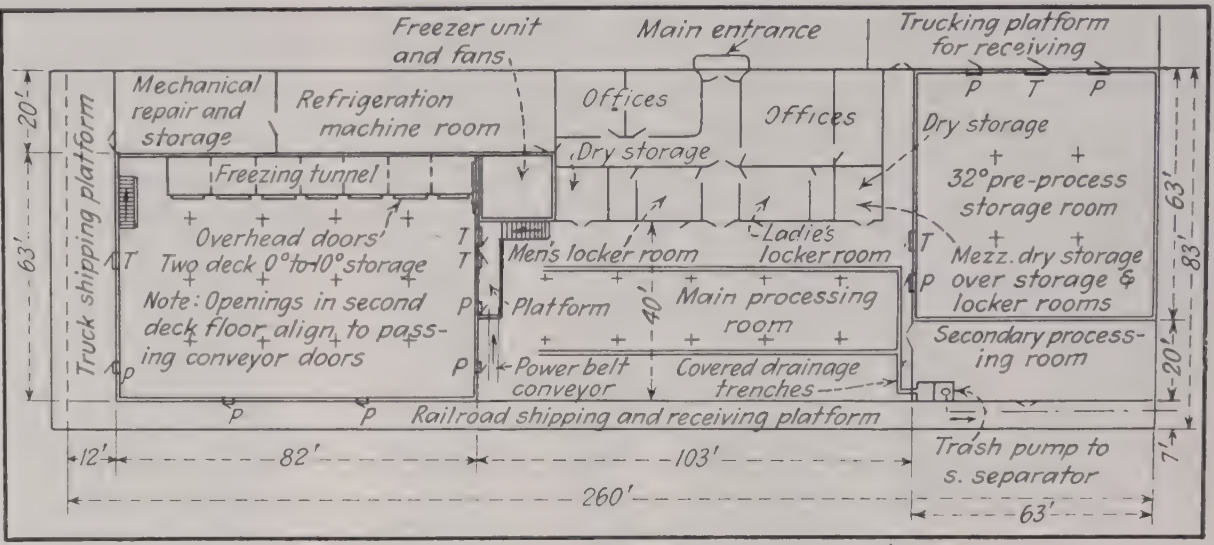

Freezer unit and fans
Main entrance
Trucking platform for receiving
P
T
P
20'
Mechanical repair and storage
Refrigeration machine room
Offices
Offices
Dry storage
Dry storage
32° pre-process storage room
63'
83'
Truck shipping platform
Freezing tunnel
63'
Overhead doors
Two deck 0° to 10° storage
Note: Openings in second deck floor align to passing conveyor doors
T
T
T
P
P
p
Men's locker room
Ladie's locker room
Mezz. dry storage over storage & locker rooms
T
p
Platform
40'
Main processing room
Secondary processing room
20'
Power belt conveyor
Covered drainage trenches
P
P
Railroad shipping and receiving platform
12'
82'
103'
Trash pump to s. separator
7'
260'
63'

FIG. 2. Plan shows location of freezing tunnel within 0 F. storage room (left).

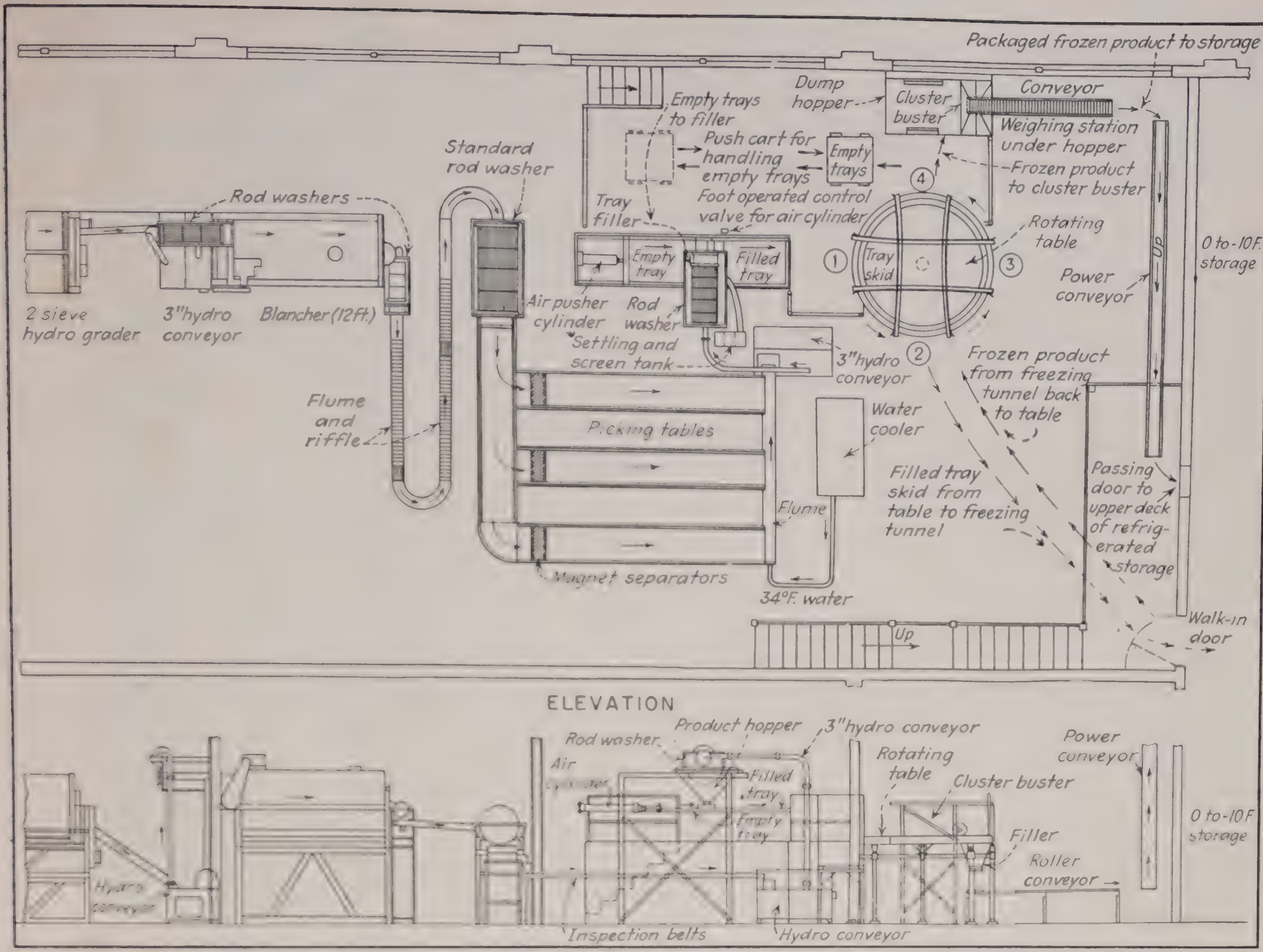

Packaged frozen product to storage
Dump hopper
Cluster buster
Conveyor
Weighing station under hopper
Empty trays to filler
Push cart for handling empty trays
Empty trays
Frozen product to cluster buster
Standard rod washer
Rod washers
Tray filler
Foot operated control valve for air cylinder
Empty tray
Filled tray
Tray skid
Rotating table
Power conveyor
Up
0 to -10 F. storage
2 sieve hydro grader
3" hydro conveyor
Blancher (12 ft.)
Air pusher cylinder
Rod washer
Settling and screen tank
3" hydro conveyor
Frozen product from freezing tunnel back to table
Flume and riffle
Picking tables
Water cooler
Filled tray skid from table to freezing tunnel
Passing door to upper deck of refrigerated storage
Flume
Magnet separators
34°F. water
Walk-in door
Up
ELEVATION
Product hopper
3" hydro conveyor
Rod washer
Air cylinder
Filled tray
Empty tray
Rotating table
Cluster buster
Power conveyor
Filler
Roller conveyor
0 to -10 F storage
Hydro conveyor
Inspection belts
Hydro conveyor
1
2
3
4

**FIG. 3.** Arrangement of equipment in main processing room. Note how filled trays go on skid on rotating table, which is then turned 90 deg., to station 2, where fork-lift truck takes off loaded skid and moves it through walk-in door of storage room to freezing tunnel. Later, skid of frozen product, taken from tunnel, is re-placed on rotating table, which turns it to station 4, where trays are removed and product emptied into cluster buster that feeds weigh packer. Packaged frozen products are elevated to upper deck of 0 F. storage by a belt conveyor.

is for safety as well as for convenience.

11. Complete cross-connection of refrigeration system assures flexibility, economy and safety.

12. Refrigeration system is arranged for maximum safety by use of properly sized traps to avoid liquid slop back.

#### Record Points Up Benefits

The following data obtained during the first year's operations indicate the values of the new set-up: Power consumption averaged 0.24 kw. per lb. of products frozen. Cost of power averaged 8c. per 100 lb. for processing, freezing and storage of 1,000,000 lb. of products.

Wastage during processing of peas was 5 percent; of lima beans, 10-plus percent. At the end of 6 months storage at 0 to 10 F., there was no reduction in quality of products, nor was there loss of weight.

Immersion chilling in the hydro-conveyor increased the effective freezing tunnel capacity by approximately 30 percent. This part of the refrigeration load was handled by the "high-stage" only.

Fruits and vegetables are prepared for freezing in similar fashion to the way they are readied for canning. Upon leaving the inspection tables, they are flumed to the hydro-conveyor, which carries them in 34 F. water to a rod separator that discharges into the hopper of the tray filling machine. Referring now to Fig. 3, the sequence of operations from this point is:

1. Trays are filled by pushing them under hopper of filling machine. This is accomplished by an air cylinder, operation of which is controlled from a foot pedal.

2. Filled trays are racked in a tray skid that stands in a section of a four-section rotating table (see figure). This table is adjacent to the filler unit.

3. When skid is full, rotating table is turned to point designated as (2) in figure, then fork-lift truck picks up skid load and carries it to the freezing tunnel.

4. After the freezing operation, the fork-lift truck picks up the skid load of frozen product and carries it back to the rotating table.

5. Frozen load is then rotated on table to point adjacent to cluster buster, designated (4) in figure, where trays are unloaded from table.

6. Trays are now emptied into cluster buster, and empty trays are placed on hand truck.

7. Truck load of empty trays is rolled in front of tray filler, and trays are placed in position to be filled.

8. Frozen products pass through cluster buster into hopper of weigh filler and are packaged.

9. Packages are moved into storage by conveyor and elevator.

Not all fruits are precooled with 34 deg. water. However, this is done on cherries to improve the pitting operation. Chilling makes the meat more firm, resulting in less loss of pulp and juice. Crushing of the fruit is also reduced by chilling. Cherries are handled in gravity flumes and on belt conveyors, not by hydro-lift conveyors.

# Bread Needs Year's Study

## Standards hearings required 17,130 pages of transcript, brought on largely by attack on use of emulsifiers

JULY 1950 appears to be the earliest possible date by which a new standard of identity for bread can be established by Food & Drug Administration. And much more likely is January 1951.

Among the reasons for such uncertainty are the lengthy transcript (17,130 pages), the sharp controversy which developed over use of certain emulsifiers or so-called ''bread softeners'', and the fact that bread is such an important part of the diet of so many people.

The hearings adjourned on September 20, after 116 formal sessions, which began on November 30, 1948. Previously, hearings had been held in 1941 and 1943. Testimony at these hearings is in the official record.

Briefs must be filed by interested parties by December 20. A tentative order will be issued by the Federal Security Administrator, probably in the spring of 1950. Earlier action is possible but extremely unlikely.

Flour, salt, and water or one or more of a number of specified liquid optional ingredients are the only *required* constituents in a loaf of bread. Twelve different categories of *optional* ingredients were included in the tentative order issued in 1943, but which was never made effective because of war conditions.

### Shortening and Emulsifiers

Optional ingredient No. 1 was ''shortening.'' It was this ingredient and the related emulsifiers that provided the major bones of contention. The other eleven optional ingredients were discussed briefly in most cases. These included various forms of milk, eggs, sweeteners, malted products, other cereal products, spices, yeast foods, oxidizing agents, and miscellaneous chemicals.

Although many pages were required for presenting the pros and cons of shortenings and emulsifiers, only a few findings of fact will probably result. Shortening manufacturers objected at considerable length to the inclusion of such materials as polyoxyethylene monostearate, claimed by some to keep bread soft longer and, therefore, more attractive to the consumer. The shortening manufacturers alleged that—

1. Non-toxicity of the emulsifiers (usually referred to as "polys") "had not been proved,'' therefore, bread containing them *may* be "injurious to health."

2. Use of the polys permitted smaller quantities of shortening to produce a loaf of bread; therefore, substitution for a "valuable constituent" was being practiced.

3. Consumers would be deceived by the softness of a loaf, thinking that it was a "fresh" loaf, making it "appear better or of greater value than it is".

Manufacturers of the polys defended their products vigorously. Principal spokesmen were Atlas Powder Co. Wilmington, manufacturer of "Myrj" and other food emulsifiers, and C. J. Patterson, Co. of Kansas City, distributor of "Sta-Soft." Data presented by their witnesses summarized numerous tests in which the polys had been successfully examined biologically and toxicologically, to an extent claimed by them to have been "rarely . . . equalled for any food ingredient". It has also been pointed out that toxicity studies on some of the oxidizing agents and other chemicals proposed by F&DA in the 1943 tentative order had been much less exhaustively studied.

It was further stated that since shortening is an optional ingredient in bread, use of less shortening because of added poly emulsifier could hardly be "adulteration." Survey data submitted by Food & Drug showed that less than 3.2 percent fat appeared in the average loaf of bread that does not contain polys, including both added shortening and the fat of the flour, milk, and any other fat-containing ingredients used in the loaf. This compared, in the same survey, with 3.0 percent fat in those loaves of bread known to contain polys.

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### In "One Package"

**While the running story on the recently concluded bread-standards hearings has been appearing in this and many other publications over the past months, this summary offers the hitherto disjointed account in one package.**

**Establishment of these standards has been a highly controversial issue since before the war. The baking industry has been, of course, deeply concerned. But the issue is of even greater importance to the suppliers of fats, oils, emulsifiers and other ingredients. And the bread standards that come out of the hearings will be highly significant to many food processors because they may establish a precedent in respect to the use of so-called chemicals in foods.**

**If, as has been maintained, loose and irresponsible charges have been leveled against particular ingredients, the evidence, even in summary form, should help to keep the record straight.**

**—The Editors**

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That there is deception of the consumer in providing a soft loaf which stays soft for several days, was said by the poly manufacturers to be a false argument. Consumer tests with freshly baked bread and with bread of various ages, some containing emulsifiers and some not, showed that there was definite preference for some of the bread containing polys, even though older than comparably soft bread, which did not contain polys. Reason for this preference was more often stated by the consumers to be some factor such as flavor, rather than "softness."

It was also contended that use of a monoglyceride or diglyceride (made by shortening manufacturers) would be no less "deceptive" to the extent that it kept the bread soft. Some also question the ability of consumers to judge freshness of bread by its softness if the loaf has been pre-sliced.

### Here Is the Choice

Possible alternatives in resolving this question, when a standard is issued, range from the exclusion of emulsifiers from bread, on one or more grounds, to the inclusion of an unlimited quantity of emulsifiers without label declaration on the bread. Optimum quantity of the polys was said to be about 0.5 percent on the flour basis (about 0.33 percent of the bread weight), roughly equivalent to 1 oz. per 20 lb. of bread. Only those emulsifiers will be permitted (if any are) which have been specifically discussed in the course of the hearing. Several proposed definitions to cover these products are in the record, so the Federal Security Administrator has some choice.

If the emulsifiers are not permitted when the final order is issued, litigation in a Circuit Court of Appeals seems likely. On the other hand, if the emulsifiers are permitted, legal action by the shortening manufacturers, the principal objectors during the hearing, seems unlikely to succeed. Although such an order would be distasteful to the shortening manufacturers, it would not restrict the use of their product, and the Court would probably leave the question to be decided on the basis of commercial competition between shortenings and emulsifiers.

HERE, in modern bakery, high-speed mixer plays vital part in making better foods at minimum cost.

# MODERN FOOD MIXING

Trend is to continuous mixing for high efficiency, and sanitation is emphasized in mixer designs . . . All types of machines and methods are discussed, and typical applications are cited

**FRANK W. McCARTHY**
Assistant Editor, "Food Industries"

Continuous mixing not only is speeding food processing operations, but is producing products of better and more uniform quality. To the food processor this means improved products at lower cost. And the trend toward continuous mixing—abetted by the switch from batch to continuous processing of the mixed ingredients—is one of the outstanding current developments in the food field.

In some industries—of which baking is an example—achievement of 100 percent straight-line production has awaited the development of continuous mixing.

Notable, too, is the trend toward improvement in the sanitary design of food mixers of various types. These advances involve both the operating features and the materials of equipment construction. In this report, the recently developed mixers will be described together with older equipment still used, in order to give readers a comprehensive picture of units available to meet mixing requirements and what types of operations each kind of equipment is best suited to handle. The status of mixing as a science is also discussed (see "Spotcheck of Mixing Fundamentals," page 82).

### The 11 Variations of Mixing

In food engineering, the broad field of mixing includes beating, blending, agitating, stirring, diffusing, dispersing, emulsifying, homogenizing, kneading, whipping, and working. And mix-

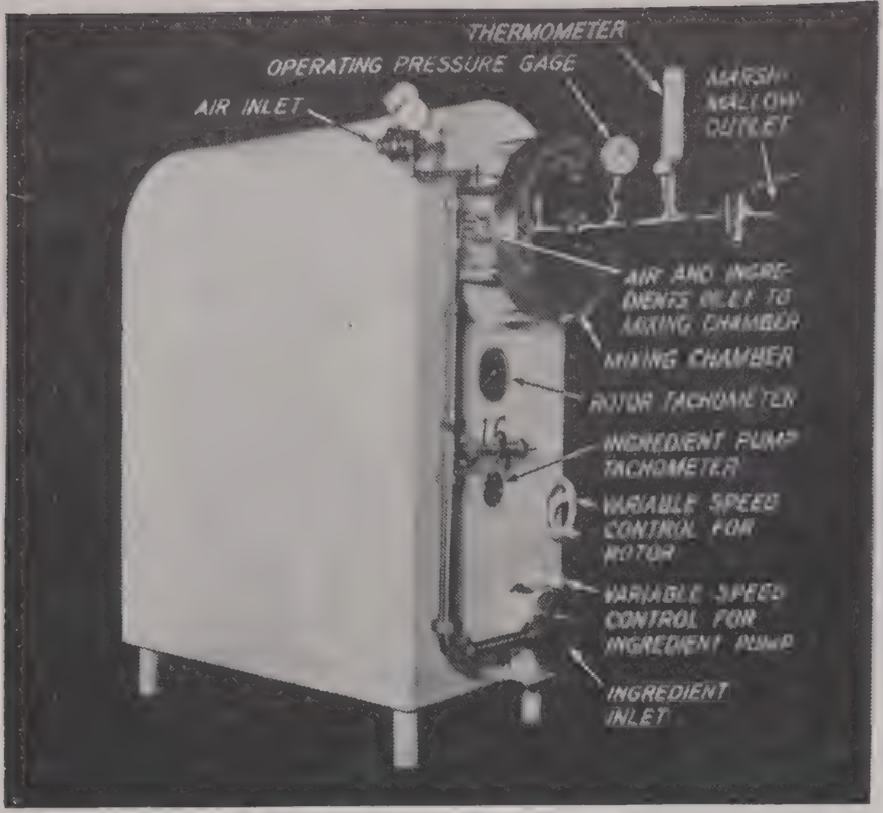

THERMOMETER
OPERATING PRESSURE GAGE
AIR INLET
MARSHMALLOW OUTLET
AIR AND INGREDIENTS INLET TO MIXING CHAMBER
MIXING CHAMBER
ROTOR TACHOMETER
INGREDIENT PUMP TACHOMETER
VARIABLE SPEED CONTROL FOR ROTOR
VARIABLE SPEED CONTROL FOR INGREDIENT PUMP
INGREDIENT INLET

**FIG. 1. LIGHT**, aerated mixes are produced in this unit from low-viscosity roughly premixed liquids and solids.

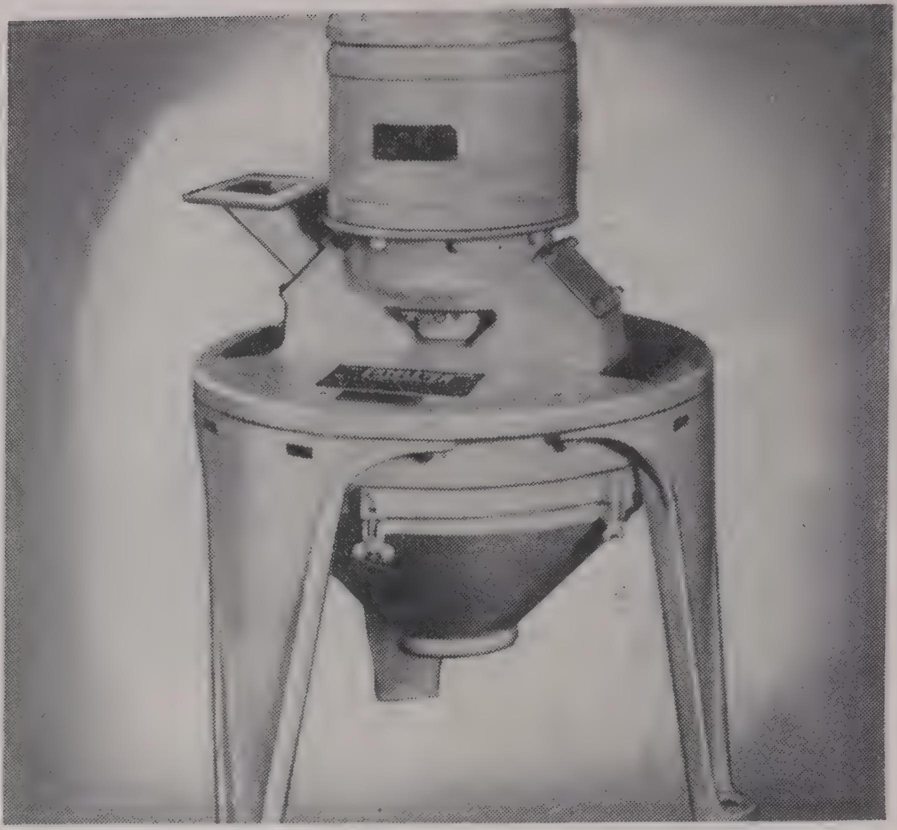


**FIG. 2. DRY** fine materials are thoroughly blended by centrifugal force at very high speeds in this machine.

ing may be employed to combine (1) solids with solids, (2) solids with liquids, and (3) liquids with liquids—as well as to incorporate air or other gases into products.

From the very first, the combining of ingredients has been one of the most common operations in the preparation and processing of foods. Today the story of this practice has come to be the story of the equipment that does the job. And the new progress is best exemplified by the many efficient mixing units devised to meet the present-day demands for high performance.

Now let us consider these outstanding units and the respective materials they handle:

### Continuous Mixing

Today, marshmallow, icings, and sponge cake batter are continuously mixed in a highly efficient small unit of new design (Fig. 1).

The mixing chamber of this unit is of but 14 in. dia. and 2 in. deep. It has two identical heads, comprising front and back stators. An ingredient pump and a compressed-air inlet into the ingredient stream are integral parts of the machine which precede the mixing chamber.

Each stator in the mixing chamber is equipped with eleven concentric rings having about 1,000 teeth. Between the stators is a rotor also comprised of eleven concentric rings of moving teeth. Ingredient mix and compressed air are forced into the center of the back stator. Initial travel is toward the periphery of one side of the rotor, then to the periphery of the other side of the rotor and out through the center of the front stator.

During this travel, the air is being entrapped in the mix as small bubbles of uniform size. At the same time, the ingredients are being thoroughly mixed. Instrument-controlled feeding of the air and ingredient mix is a feature of this development. Another important advantage of this unit is the fact that the finished product can be pumped direct to the next step in the process.

In another unit virtually any finely granulated or powdered ingredients can be mixed or blended continuously by the action of high-speed centrifugal force, at rates up to 200 lb. per minute. Compactly designed, the machine (see Fig. 2) requires only 12 cu. ft. of space (3 ft. high x 2 ft. dia.).

Heart of this unit is a high-speed mixing rotor directly connected to an enclosed motor. This rotor consists of two steel disks about 1 in. apart. Between these disks is a large number of specially designed impactors.

Material entering the machine is fed by a distributor to the center of the rotor and spun out by centrifugal force in a thinning film as it approaches the perimeter of the rotor. It is discharged uniformly via a conical hopper. High-speed centrifugal action breaks up the lumps, resulting in a homogeneous product. Peripheral speed of the rotor is more than 12,000 ft. per min., producing a thorough blend of all ingredients.

In still another new unit, mixing of macaroni and spaghetti components now is accomplished in a continuous operation in which the ingredients are fed at a predetermined rate.

Semolina discharges from a feed hopper through an adjustable slide gate onto a continuous belt conveyor. Running at a fixed speed, this belt delivers the flour to the head of the mixer in continuous flow.

Water feeds continuously from a small pipe having a series of nipples spaced over the width of the mixer at the head end. Supply is from a surge tank equipped with a float valve that maintains a uniform head on the line. Flow of water to the nipples is regulated by a plunger-type plug valve.

This mixer (see Fig. 3) consists of a horizontal cast-steel housing and two parallel shafts equipped with blades. Driven from a common gear, the shafts rotate in opposite directions. Faces of the successive blades oppose each other in material movement, but the thrust of the forward-movement blade-face exceeds that of the return blade. Thus, an oscillating movement results, with a gradual forward travel of the material. Since the shafts rotate in opposite directions, there also is a cross movement of material which aids the mixing.

Dough passes from the mixer through an adjustable slide gate to a screw press, which supplies the necessary kneading action.

An ammeter connected to the motor driving this press indicates the load on the screw. Stiffness of the dough is measured in this manner. If the dough is too dry or has too much moisture, corrections are made in the feed of either water or flour. The result is a dough of consistent mix.

Macaroni or spaghetti is formed by extruding dough through holes in the screw-press head.

### Emulsification, Too

Among the accomplishments of one widely used food processing unit is continuous emulsifying. And this machine will heat or cool the product

## Food Ingredients Continuously

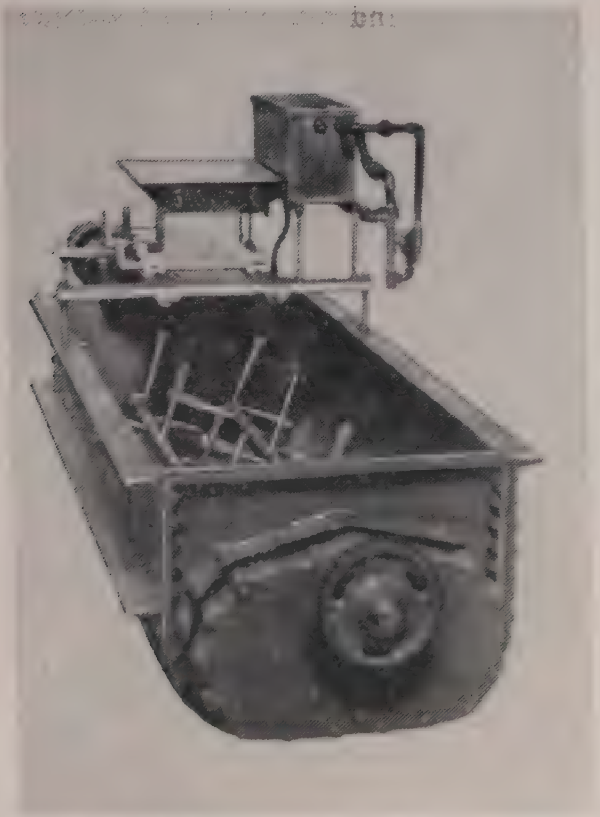


**FIG. 3. MACARONI** dough is produced in this proportional-feeder mixer.

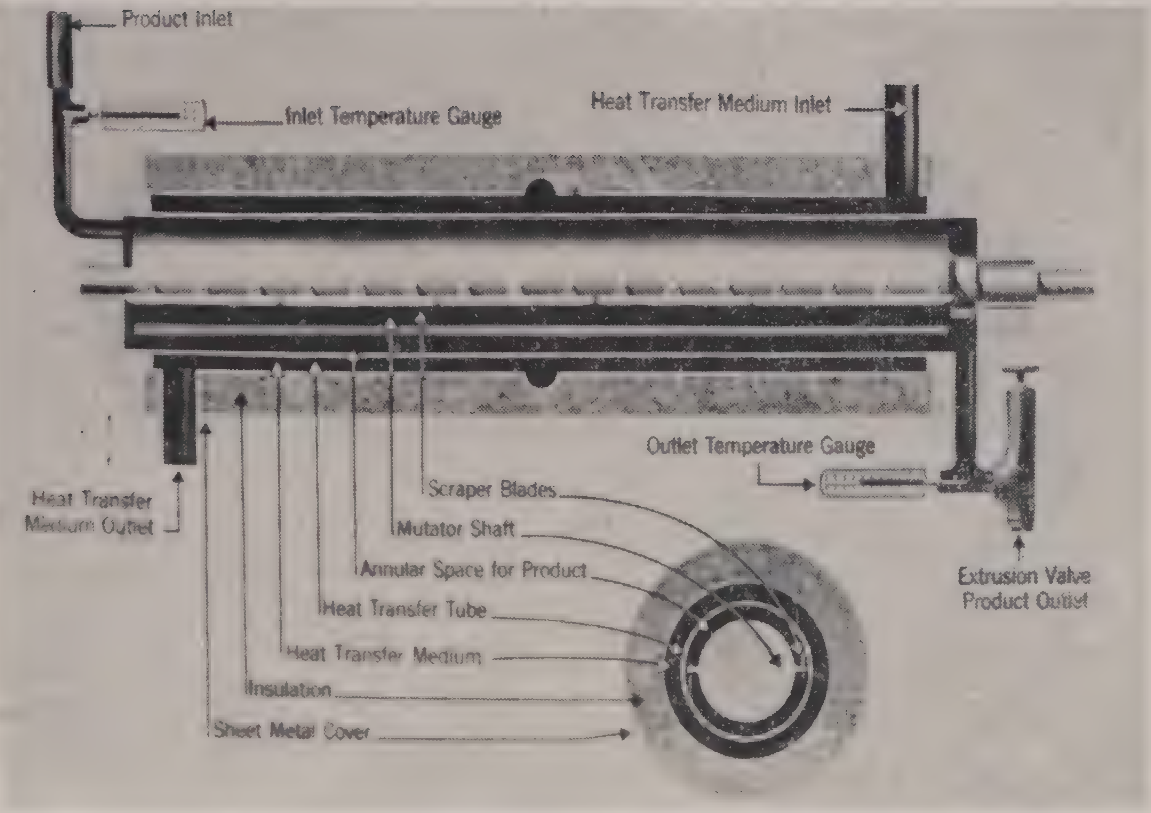

Product Inlet
Inlet Temperature Gauge
Heat Transfer Medium Inlet
Outlet Temperature Gauge
Heat Transfer Medium Outlet
Scraper Blades
Mutator Shaft
Annular Space for Product
Heat Transfer Tube
Heat Transfer Medium
Insulation
Sheet Metal Cover
Extrusion Valve Product Outlet

**FIG. 4. LIQUID-SOLID** materials having a wide viscosity range are processed in this unit, which combines heat transfer with an emulsifying action.

rapidly—or do both in sequence—while emulsification is taking place. It will process liquid components, liquids and solids, or liquids and gases.

The unit (see Fig. 4) consists of a series of cylinders or tubes, one inside the other, and a rotating central cylinder or mutator, with attached scraper blades. The outermost shell is of stainless-steel sheet metal. Next comes a layer of insulation, then two concentric tubes between whose walls the heat transfer medium flows. Inside the smaller tube is the rotating cylinder, and the material being processed flows between the periphery of this cylinder and the inside walls of the inner heat-transfer tube. Blades mounted on the rotating cylinder mix the ingredients.

It is a closed system in which temperature, pressure and rate of flow are under automatic control. Material to be processed is pumped through the narrow annular passages between the heat transfer tube and the rapidly rotating mutator. The blades attached to the mutator not only agitate the material but keep the heat-transfer surface clean, effecting a high rate of transfer.

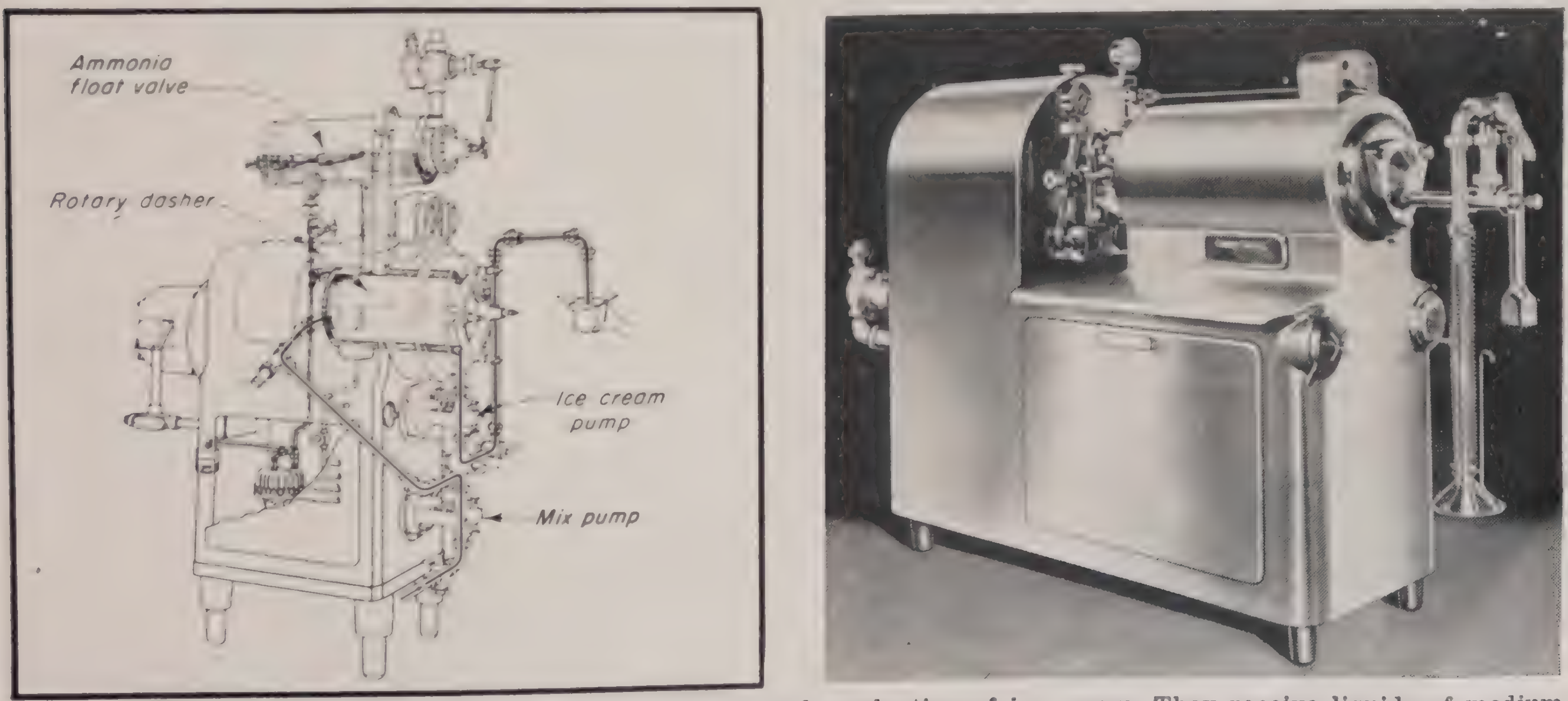
### Heat Transfer Media

Water, brine, ammonia, Freon, steam or Dowtherm may be used as heat transfer media. Products such as starch pastes, purees, marshmallow, eclair filling, and sponge-cake batter can be processed.

Let us now consider the manufacture of ice cream. Here, air is whipped into the mix as it flows through a continuous freezer. One type of continuous freezer (Fig. 5), consists of a cylinder and a dasher. A pump feeds mix continuously and at a measured rate into one end of the cylinder. A second pump withdraws the frozen product continuously, also at a fixed rate. An air line connected to the cylinder maintains constant pressure during the whipping and freezing process. The frozen product is pumped through a pipe line to filling units.

With another type of continuous

## Two Ice-Cream Units—Also Continuous


Ammonia float valve
Rotary dasher
Ice cream pump
Mix pump

**FIGS. 5 & 6. SEEN HERE** are mixers used for uninterrupted production of ice cream. They receive liquids of medium viscosity (free flowing) and develop a mixture of heavy viscosity, through agitation, aeration, and product-heat removal.

freezer (Fig. 6), air is injected into the mix being pumped to the freezer. In the freezer the air is whipped through the mix.

This freezer has a heavy stainless-steel tubular shaft with blades that scrape the cream from the walls of the refrigerated cylinder. Inside this rotating shaft, whipping action is imparted by a stationary shaft, and inside the stationary shaft is a smaller rotating whipping shaft. As the cream moves forward through the tubular shafts, it is whipped and frozen. Pressure from the freezer supply pump forces the mix through the unit.

Fruits and nuts are incorporated into ice cream continuously as it is pumped from the freezer. This is done with a positive feeder consisting of a hopper, metering starwheel, enrobing chamber, enrobing starwheel, and mixing wheel.

Feeding rate of the fruit or nuts is controlled by a thumb-screw adjustment which sets the depth to which pockets in the fruit metering starwheel are to be emptied. Capacity of the feeder is adjusted by means of a varispeed drive to match, reasonably closely, the output of the freezer.

Turning to butter: Continuous mixing has been utilized in machines used experimentally for the continuous production of butter. In this operation, broken cream is discharged from an emulsion breaker to a serum separator wherein the fat and serum are divided by stratification. The highly concentrated hot liquid fat then flows to a composition control pump. This is a triplex piston pump, with adjustable stroke, in which two sections receive the fat fraction from the serum separator and the third section receives a salt water solution from a supply tank. All three cylinders discharge into a common manifold to effect pre-mixing. Then the material is chilled and further mixed in a machine which is an adaption of the continuous ice-cream freezer.

Another continuous mixer-processor has been applied to the production of fondant in the confectionery industry. This equipment comprises a supply hopper, feed pipe, and creamer. The latter consists of a horizontal water-jacketed cylinder. Inside is a rotating shaft with blades attached. Forward-sloping blades are arranged on the shaft in spiral form. In this manner, the fondant is moved through the machine by the action of the flights as it is being creamed and cooled.

Now to another unit: When plasticizing and texturing are desirable, lard shortening and other blended vegetable oils are processed continuously in a unit comprised of a gear pump, rotating impellers and stators, and an homogenizing valve. Marshmallows and nougat also are processed in this machine.

On entering the machine, the material is compounded as it passes through the gear pump. Then it goes into the area of the first impeller, where it is drawn outward and battered into an abutting stator. Four semi-circular prongs on the impeller impinge the material against the 10-deg. blades of the stator. This impinging action occurs continuously rather than at a single break.

After it passes between the blades, the material is forced inward against the opposite face of the stator. And when the material leaves this area, the process is repeated by another set of impellers and stators. Then the product goes through an homogenizing valve as it leaves the machine.

### Continuous Premixing

Deaerated water and syrup for carbonated beverages now are continuously premixed before bottling to give more uniform quality and speed the

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# Spotcheck of Mixing Fundamentals

Of all the unit operations in the food processing industry, mixing is one of the most difficult to analyze scientifically. The fact is that equations for pre-calculating the degree or speed of mixing—for a cake, a candy, or whatnot—have yet to be developed. In short, sample or test runs remain the method of determining mixing formulas, because even today there is very little data available on the various forces at work in these operations.

True, conventional mixing is a simple operation. For instance, in preparing a cake, two or more food ingredients are readily mixed with the use of a pan and a spoon. But—though the product appears to be of uniform consistency throughout, a microscope will quickly show that it is not.

Observations made when dry-mixing three or more granular ingredients of varying specific gravity and particle size in a commercial machine have shown that continued operation of the mixer after specific rhythmic periods of time can lead to an *unmixing* of these ingredients.[1]

In short, this art is highly empirical. This explains why a very great number of different mixing devices have been developed over the years. And considering the extremely wide variety in characteristics of the materials mixed, it is understandable why "pure prediction" is unreliable in gaging results.

It is also seen that these operations range well beyond the mere stirring together of two or more materials. The basic object—theoretically—is the perfect blend, whether of liquids, solids or gases, or any combination thereof. John H. Perry[2] puts it this way:

"In all cases, two or more materials existing either separately or in an unevenly mixed condition are, by mixing, to be put into such a condition that each particle of any one material lies as nearly adjacent as possible to a particle of each of the other materials."

To attain such a perfect mix in commercial practice is too much to attempt. Rather, the work-a-day goal in mixing is a product combined as satisfactorily as possible.

### Mixes, Objectives and Equipment Design

*Solids with solids.* Here, the operation basically involves agitating, stirring, and in some cases working. In this group fall the dry prepared mixes.

*Solids with liquids.* Operations here may vary from agitating or stirring all the way to kneading, as with heavy bread doughs. Whipping, homogenizing, emulsifying and working are also parts of these mixing operations, as in the cases of salad dressing, cake batters and pastes. In this group, consistency ranges from vegetable purees to macaroni doughs.

*Liquids with liquids.* This procedure may be one of blending, diffusing, dispersing, emulsifying or homogenizing. It may be limited to simple agitation, stirring, or whipping.

Of course, air and other gases may be additional components.

Varying objectives of the commercial mixing process follow:

1. A physical mixture of two or more components which do not ordinarily separate when once mixed. *Examples*: (a) blended flours, leavening agents and sugar (solid-solid); (b) flavoring syrup and water (liquid-liquid); (c) flour and melted shortening (solids-liquid without change in particle size).

2. A non-settling or non-separating mixture of two or more components that ordinarily separate into layers or strata if not kept in constant motion (emulsion or suspension). *Examples*: (a) mayonnaise (liquid-liquid); (b)

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[1] Burton, L. V., FOOD INDUSTRIES, Oct. 1933, page 390.

[2] In his *Chemical Engineers' Handbook*, Second Edition, 1941, McGraw-Hill Book Co.

bottling operation. This procedure has found particular favor in plants which produce a large quantity of one particular flavor.

Premixing is accomplished by pumping the water and syrup separately but simultaneously into the dome of the carbonator-cooler. The two fluids flow in unison over the refrigerated stainless-steel plates and baffles in the carbonator-cooler, and the carbon dioxide is introduced into the mix during this operation. Collected in a reservoir at the bottom of the carbonator-cooler, the mix is passed to the filler for bottling.

As the syrup and water are pumped, each flows through a meter that measures its flow. Working together through a differential mechanism, the two meters actuate an air valve that controls a pneumatic flow valve in the syrup pump bypass. Thus regulated, the syrup flow is always in correct proportion to the flow of water.

### Colloid Mills and Homogenizers

Certain materials naturally settle, after mixing, into layers or strata. To overcome this, special types of mixers have been developed. Into this group fall emulsifiers, colloid mills and homogenizers. In these, the mixing action is accomplished largely through dispersion, a scattering of the globules or particles of the components to form an emulsion (liquid components) or suspension (one component a solid).

The two components of such mixtures are known as the "dispersed phase" and "continuous phase." The latter is the containing liquid, while the globules in the emulsion and the fine ground particles in the suspension are the "dispersed phase" components.

Stability in these mixtures increases as: 1. Specific gravities of phases are equalized; 2. Particle size of the dispersed phase is decreased; 3. Viscosity of the continuous phase is increased, as in mayonnaise; and 4., the continuous phase tends to solidify, as in ice cream or marshmallow.

With high concentrations of globules or particles, addition of an emulsifying agent may be necessary to avoid separation. In some instances, this agent is soluble in one or both of the other components. In others it is insoluble in both. If soluble in both, it is most effective when its solubility in one liquid is much greater than in the other. If insoluble in the second component, it functions best when very finely divided.

Among the emulsifying agents used in the food industries are the proteins, dextrins, starches, gums and pectins.

In the unit shown in Fig. (7), beater-type agitators produce an emulsion by simple whipping action. It is in the making of salad dressings, whipped eggs, and the like, that this equipment is used.

In colloid mills, disintegration and mixing are effected by a surface rotating at 1,000 to 20,000 rpm. in close relation (of the order of 0.001 in.) to a stationary surface or a surface rotating in the opposite direction.

The fineness of emulsions or colloidal suspensions depends on the amount of "shearing" which the particles or globules in the mixture receive. Colloid mills may be classed as smooth-surface or rough-surface types. The rough-surface type can be satisfactorily operated at slower speeds than the smooth because the impact or attrition effects are greater.

The smooth-surface type depends upon a force of disintegration known as "hydraulic shear." Here, thin layers or films of liquids on both the working surfaces of the mill set up powerful shearing stresses on the thin layer of liquid between the films.

In one single-stage colloid mill, the mixture, fed by gravity from the top, is forced between a rotor and stator,

homogenized peanut butter (solid-liquid).

3 A physical change. *Examples*: Sugar solution (solid-liquid with change in particle size).

4. To speed up reaction. *Examples*: (a) bakery doughs (solid-liquid); (b) ice cream or pasteurized milk (liquid-liquid to hasten temperature transfer).

To produce these results, there is employed equipment ranging from the simplest stirring or agitating devices to the highly complex colloid mills or homogenizers. Pressure, vacuum, heat, and refrigeration may figure in the applications.

### Objective Cited

Design of the mixer and its impeller should be such that the movement imparted results in an "even" distribution throughout the mass of each component ingredient. In other words, portions cut from the end product should be as nearly like other portions as it is possible to obtain. It is, of course, pertinent that the even distribution is achieved in a minimum of time and at a reasonable cost in power.

.Present initial practice is to make a detailed laboratory study of the mixing problem to be solved. The design then proceeds on the basis of these data.

The devices which impart movement are the stirrers or agitators attached to, built into, or operated in, vessels which contain the ingredient materials. These vessels confine or direct the materials being mixed to the zone or zones in which the mixing force is effective.

Construction and design of the vessels are as important as the design of the impellers. Here, the term "mixer" is used to designate both the containing vessel and the devices applying the mixing force.

In general, the movement element identifies the mixer as to type. Examples are: Arm, turbine, propeller, spiral and paddle mixers. In some instances, the containing vessels themselves provide the mixing action (such as tumbling or revolving mixers).

Sometimes the mixer is identified by the shape or design of the containing vessel, within which may be operated many styles of replaceable agitating devices. An example is the vertical bowl-mixer commonly used for cake, confectionery, icing and mayonnaise.

Homogenizers and colloid mills may be classified as mixers in that they produce a more uniform distribution of ingredient components in an unstable or semi-stable emulsion of liquids and liquids, or small amounts of solids with liquids.

### Choosing Equipment

To select the right mixer for a specific job, size and shape of the containing vessel, desired movement, and time required to obtain a satisfactory mix must be considered. And accordingly, the following specific working questions should first be answered:

1. Is the mixture liquid, dry, or pasty? (a) Is it fluid or viscous? (b) Is it granular or powder? (c) Is it plastic or gummy?

2. Will the components mix easily? (a) Are their specific gravities the same? (b) Do they have the same particle size? (c) Are the solids easily wetted or dissolved by the liquids? (b) Do the liquids mix well with each other? (e) Is heat or refrigeration to be applied? (f) Does the viscosity or fluidity change during mixing?

3. In what proportions do the components make up the mixture?

4. In what order is each component added to the mixture? And what is the effect if the order of addition is changed?

5. Is the operation to be batch or continuous?

6. Is the mixture a final product or an intermediate material?

In view of the complexities and the empirical nature of the art of mixing, much can be learned from industry practice. And it is the purpose of this report on mixing to bring to your attention the types of mixers available and the various kinds of mixing operations for which they are suitable in food processing.

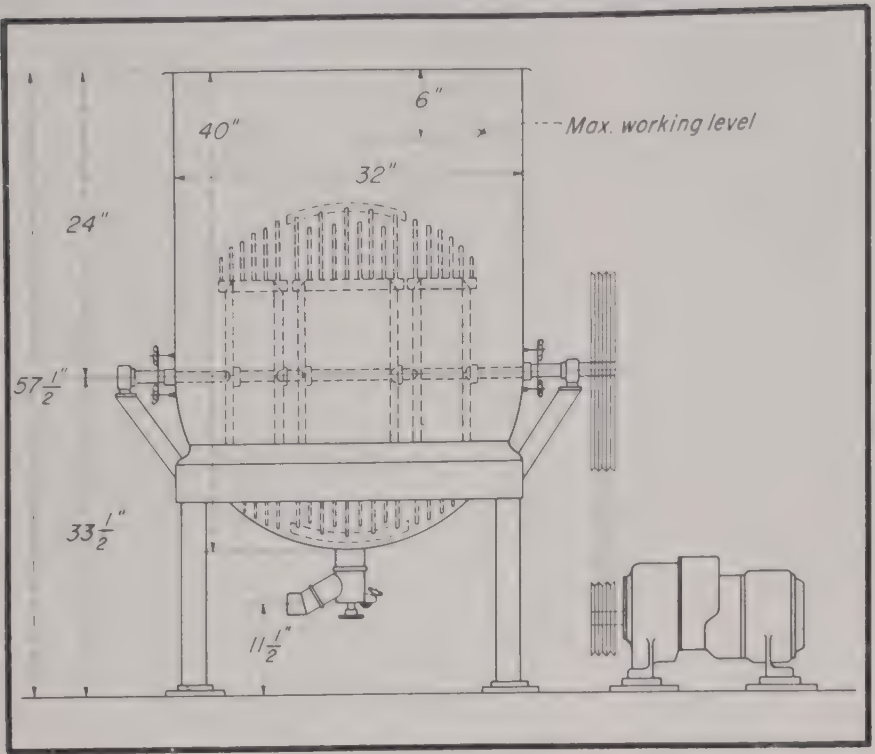


FIG. 7. EGG and light salad dressings are emulsified by simple whipping action of the agitators in this unit.

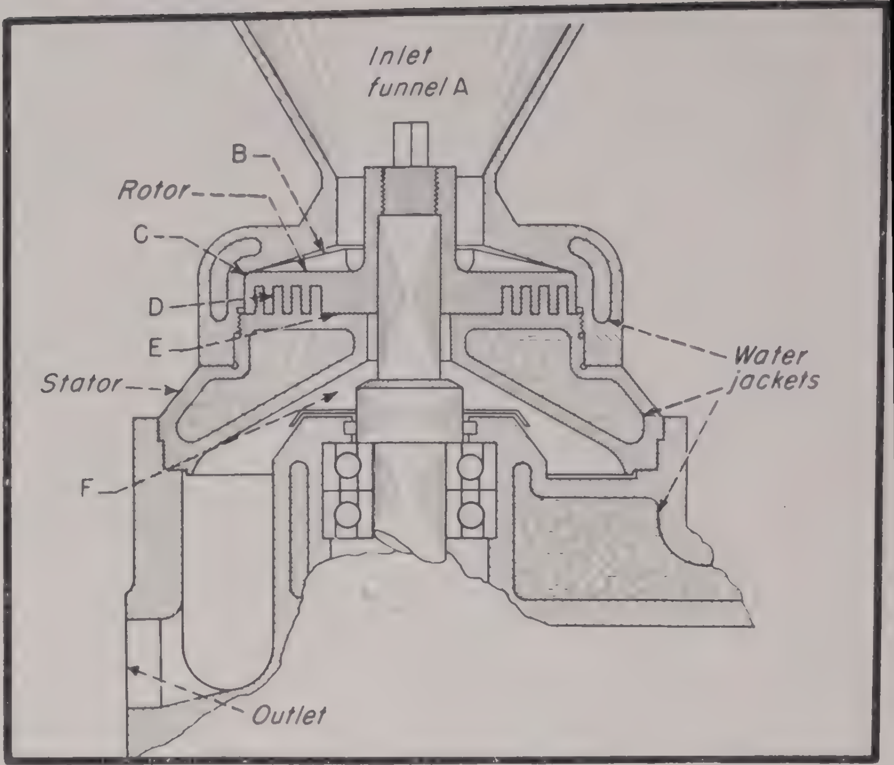


FIG. 8. SMOOTH purees, and vegetable, fruit, and flavoring pastes are produced by action of this colloid mill.

leaving the machine via a spillway. The rotor, consisting of a smooth face upon a frustum of a cone, runs at speeds from 3,600 to 17,000 rpm. Clearance between rotor and stator face is adjustable in increments as small as 0.001 in.

In one two-stage colloid mill material upon entering is forced through the first-stage gap, by impellers on the front of the rotor face. Pressure built up by the impellers forces the material across the outer edge of the rotor, then inward across the second stage, or back face, where it receives a finishing treatment.

In the mill illustrated in Fig. 8, the material receives three treatments. Impellers (B) on the top of the rotor (which travels at speeds up to 20,000 rpm.) produce an intimate blending of the materials and also force the material through the machine. The second mixing action takes place at (C). The third is effected at (D) and (E) as the material is driven against centrifugal force between the speeding rotor and stator, which may be cut, when desired, with clipping rings or V-grooves.

The mills are constructed so that they may readily be disassembled to expose all faces for cleaning. Surfaces coming in contact with foods are made of corrosion-resistant metals.

These machines process cooked or uncooked meats (for baby foods), creamed cheese and cheese blends, fish pastes, essential oils, flavoring ingredients, cake mixes, pie fillings, cocoa, and chocolate syrups.

### About Homogenizers

Essentially, homogenizers are high-pressure pumps which force roughly mixed liquids, or suspensions of relatively small amounts of finely ground solids in liquids, through very small openings to effect efficient dispersion.

In one single-stage homogenizer, the mixture enters as a suction valve opens on the backward stroke of the piston. On the pressure stroke, the suction valve closes, the discharge valve opens, and the piston forces the liquid through the homogenizing valve. This machine operates at 1,500 to 2,000 psi. A spring assembly controls the pressure on the homogenizing valve. This unit is reported giving good results in handling cream and ice cream.

For the production of low-viscosity products, two-stage homogenization is beneficial. In single-stage homogenization, a fine break-up may be obtained, but the particles attempt to coalesce. This clumping is eliminated by second-stage homogenization at lower pressure than in the first stage.

### Two-Stage Units

In one two-stage homogenizer, pressures in both stages are set by a dual-acting valve (Fig. 9). There is a shearing action as the product is forced between the valve plug and seat. Then the product, traveling at high speed, is impinged against an impact ring as it is discharged from the valve area. Now the product goes through a passage of different diameters, under pressure of 200 to 750 psi., depending on the product's viscosity. It is this secondary pressure that breaks up the clumps of tiny fat globules formed after the first treatment.

In another homogenizing unit, the second-stage valve, is adjusted to set up a predetermined pressure between it and the first-stage valve. Under the pressure built up in the cylinder block, the product is discharged through the first-stage valve into the area of predetermined pressure between the two valves. Then it passes to atmospheric pressure through a second-stage valve.

A homogenizer which operates at the relatively low pressure of 10 to 900 psi. is illustrated in Fig. 10. Instead of applying the pressure by one or more pistons, a gear pump is employed to force the material through the homogenizing valve.

### Paddle Mixers

Of the many different kinds of mixers, the paddle type is the most commonly used. And while the basic design has not been changed, these mixers have been improved in respect to sanitary considerations. In most instances, the paddles can be completely removed from the mixing vessel for cleaning. And this, in turn, exposes the entire inside surface of the vessel for easy and thorough cleaning.

The steam-jacketed double-motion paddle cooker illustrated in Fig. 11 and the accompanying sketches, exemplifies the sanitary features of the modern mixer. All exposed faces on this machine are either stainless steel or white enamel, to prevent collection of drip and dirt. Noncorrosive materials are extensively employed for mixer parts which come into contact with the product.

Simple in construction, paddle mixers come in a great variety of models, with vessels and agitators of various designs and shapes. They are used for mixing liquids, pastes of moderate consistency, and low-gravity solids.

When heat is applied during the mixing operation, the agitators are often supplemented with scrapers to prevent caking or overheating.

For continuous blending of either dry or semi-wet materials, the paddles are arranged to form intermeshing fingers.

Another type of paddle mixer (Fig.

14) uses a whipper-agitator which sets up a localized swirling motion combined with an intermixing movement of the ingredients. This type of mixer is used for making mayonnaise, marshmallow-whips and sponge cakes. This same type of vertical mixer is equipped with different agitators for use with heavy doughs and pastes.

The drive on the mixer illustrated is arranged to vary the ratio of the revolutions of the agitator about its own axis to the number of revolutions which the agitator makes in the bowl. For mixing, the beater revolves four times while the head revolves once in the bowl. For whipping the beater revolves twice while the head revolves once.

### Propeller Mixers

Mixers of the propeller type are usually high-speed units. They are employed with liquids of low viscosities and mixtures containing a low percentage of solids in suspension. An intermediate-speed propeller mixer, however, is used for liquids of medium viscosity, such as syrups.

Propeller mixers may be of single- or double-blade design. Single or dual propellers will transmit the same power for mixing action. Which to use is decided by factors other than power.

In general, only one propeller is needed for liquids of low viscosity. The propeller can then be placed well below the surface, where the slipstream will scour the bottom of the tank and prevent settling. The thrust stream from the propeller will rapidly turn the whole body of liquid.

Dual propellers (Fig. 15) are used when the viscosity of the liquid makes it difficult to establish uniform circulation throughout the tank. The heavy syrups and pastes require these dual propellers. Many types and combinations of propellers are used, such as push, push-pull, studded, perforated, and others.

Propeller units may be portable from one mixer to another, or they may be fitted into the sides or lids of the containing vessel as stationary units. To give a variety of movements to the mixture, they may be operated at any angle between the vertical and horizontal. If located off the center of the containing vessel, a highly effective mixing action is produced, even in tanks or vats containing thousands of gallons of liquid milk, fruit juices, vegetable oils or sugar syrups.

When a light powdered material is to be mixed into the liquid, the mixer shaft is positioned so as to cause the formation of a vortex. Then the powder is drawn to the agitator and distributed through the liquid (instead of floating on the surface).

There are many processes involving agitation in which a side-entering propeller (Fig. 16) is required. This type is most commonly used with large batches of light liquids and where great speed is not necessary. The entire content of the tank is brought gradually under the influence of the propellers, since the motion produced in the liquids is a swirl.

### Turbine Mixers

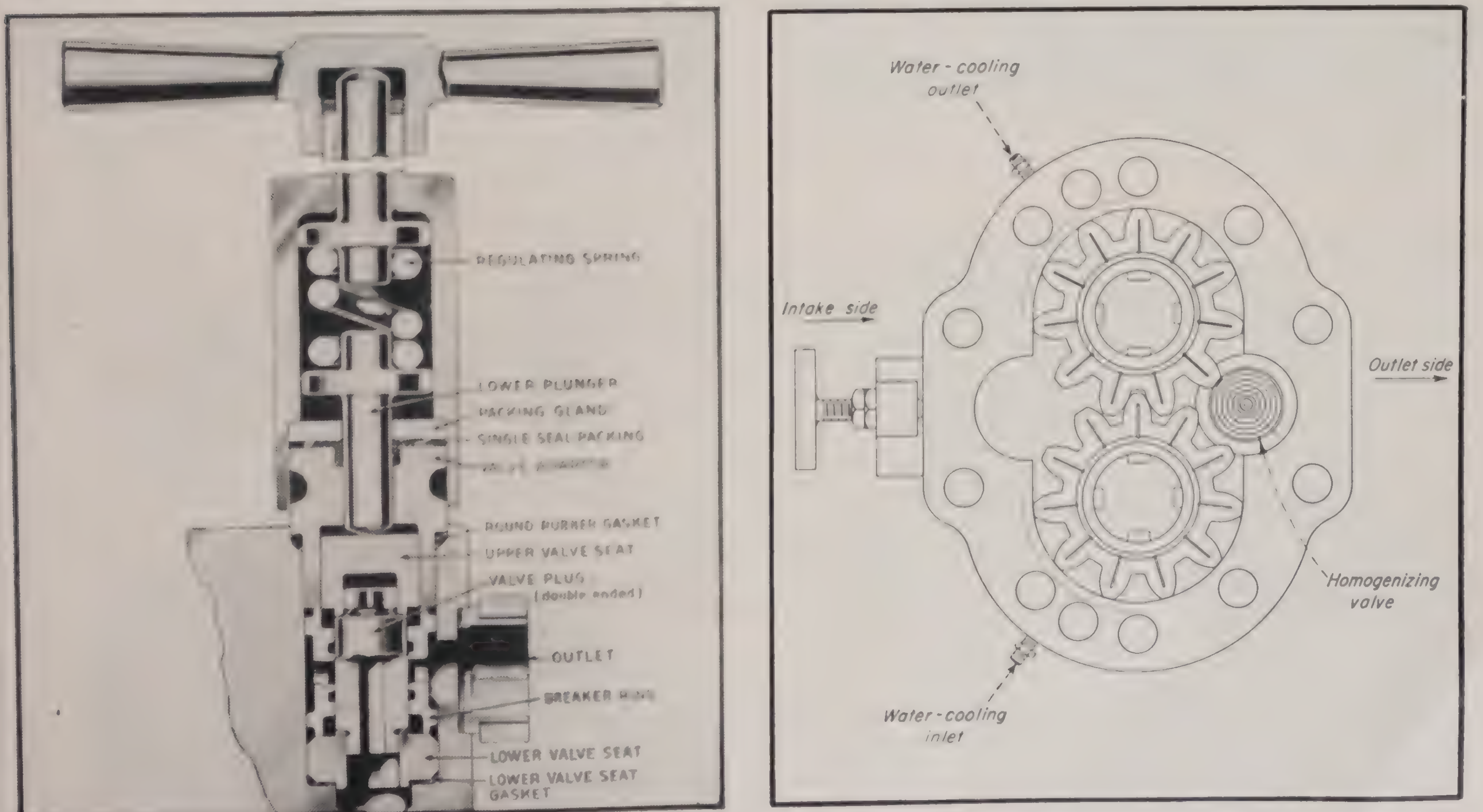
In food plants, the best application for turbine mixers is in the blending or mixing of liquids ranging from low to high viscosities. Material enters the impeller at the center in a direction parallel to the axis. The material is accelerated by the action of the vanes and is discharged tangentially from the impeller at high velocity. Direction is thus abruptly changed to effect mixing.

Thrust radially by the impellers against the walls of the containing vessel, the material is deflected upward or downward to set up an active stirring movement throughout the mixture. For emulsions, suspensions and liquids of high viscosities, two or more turbines are used, and these are equipped with stationary deflecting blades. A simple turbine will suffice for liquids of low to medium viscosities.

### Centrifugal-Pump Mixer

Another type mixer consists of a centrifugal pump mounted outside a cylindrical vessel. Here, a stream of liquid is injected into the vessel with sufficient force to set up a swirling motion. This speeds the solution of soluble solids in liquids and keeps nonsoluble solids in suspension. Ingredients to be added in dough batches are mixed with this type of unit. Other uses are

## "Workings" of Two Different Homogenizers



**FIGS. 9 & 10. LIQUIDS** such as milk, cream, and ice-cream mix are products stabilized by homogenizers. Material is forced through very small valve openings (left) by a piston pump. In type unit shown on right, a gear pump is used.

# Most Commonly Used Are the Paddle Mixers

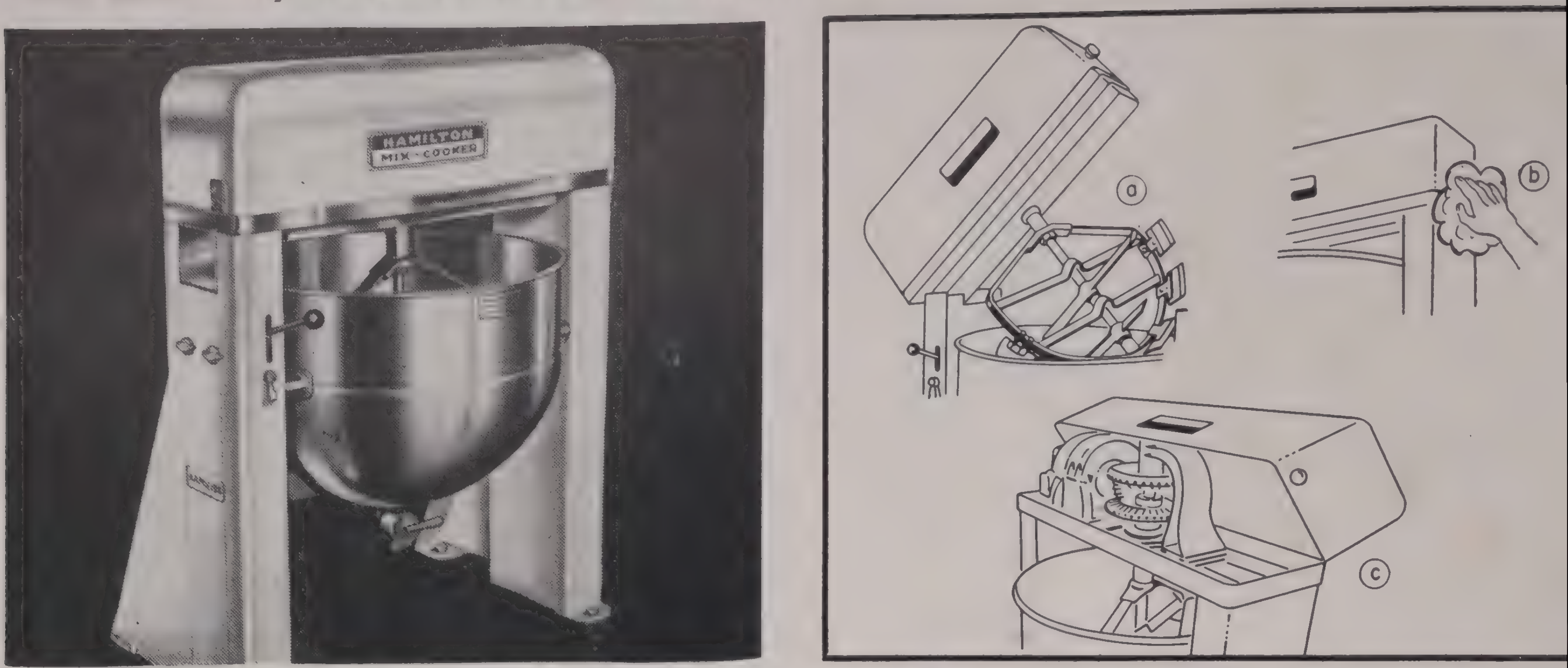


**FIG. 11. SANITARY** aspects of modern mixers are exemplified by this unit. Features are detailed (right) in sketche (a) Removable paddles, (b) stainless steel and white enamel surfaces throughout, and (c) motor and gears enclose

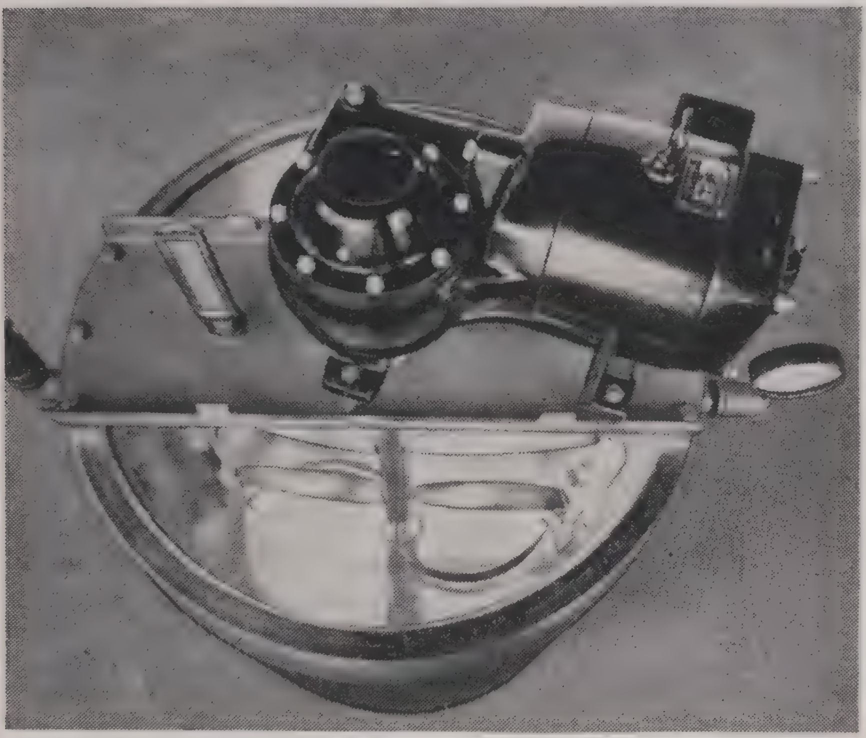


**FIG. 12. SINGLE-MOTION** agitator with scraper blades. It is used for heavy food products, such as vegetable purees.

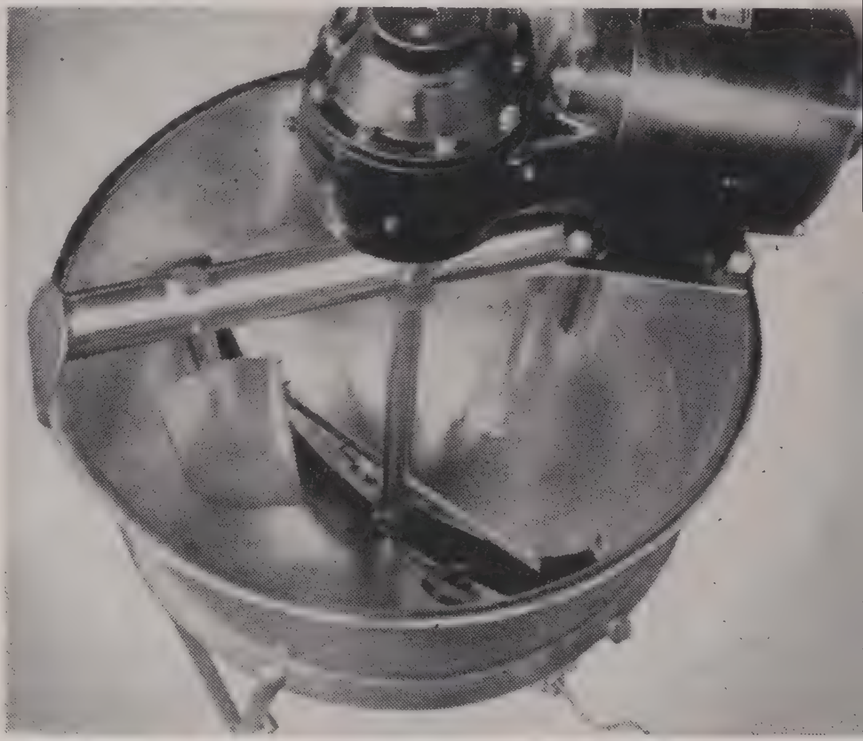


**FIG. 13. ANCHOR-TYPE** agitator with scrapers. Adjustabl baffles prevent vortexing and speed transfer of heat.

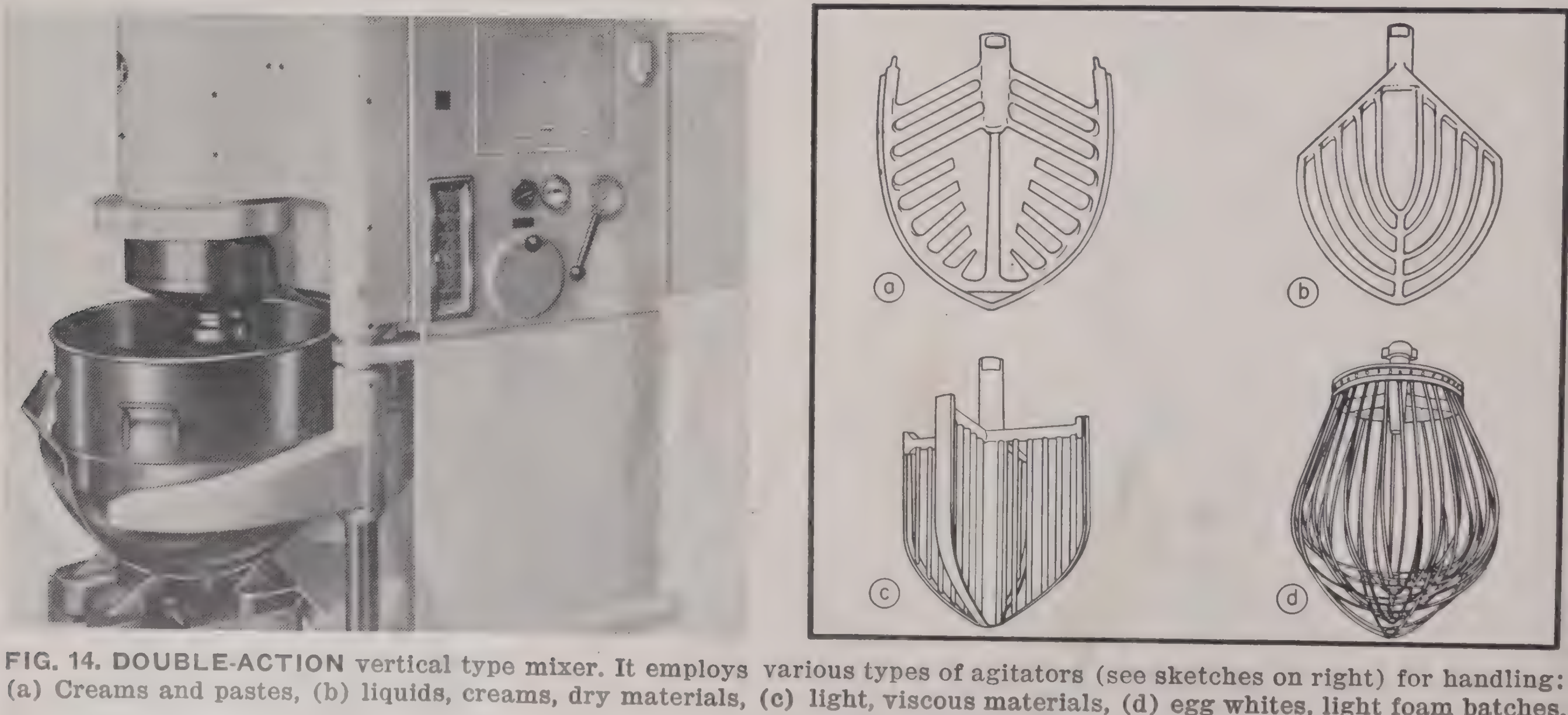


**FIG. 14. DOUBLE-ACTION** vertical type mixer. It employs various types of agitators (see sketches on right) for handling: (a) Creams and pastes, (b) liquids, creams, dry materials, (c) light, viscous materials, (d) egg whites, light foam batches.

## Propeller Units Are Offered In Several Types

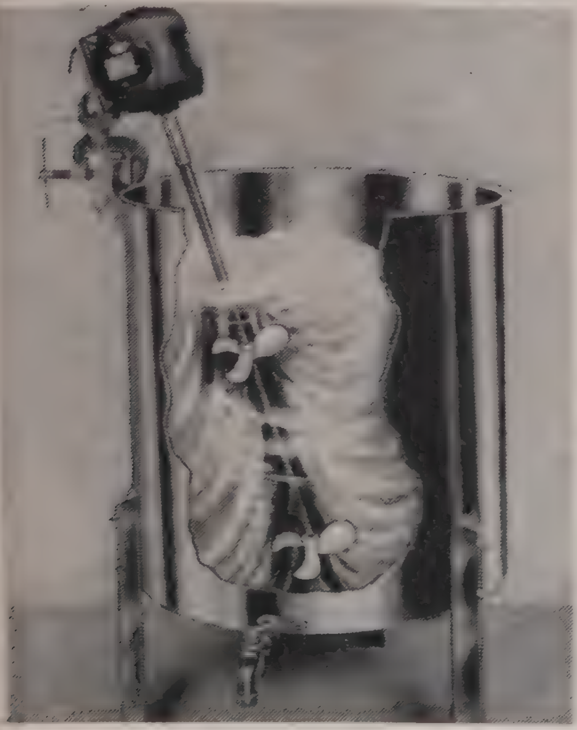


FIG. 15. **DUAL** propellers in tandem employed for mixing heavy syrups.

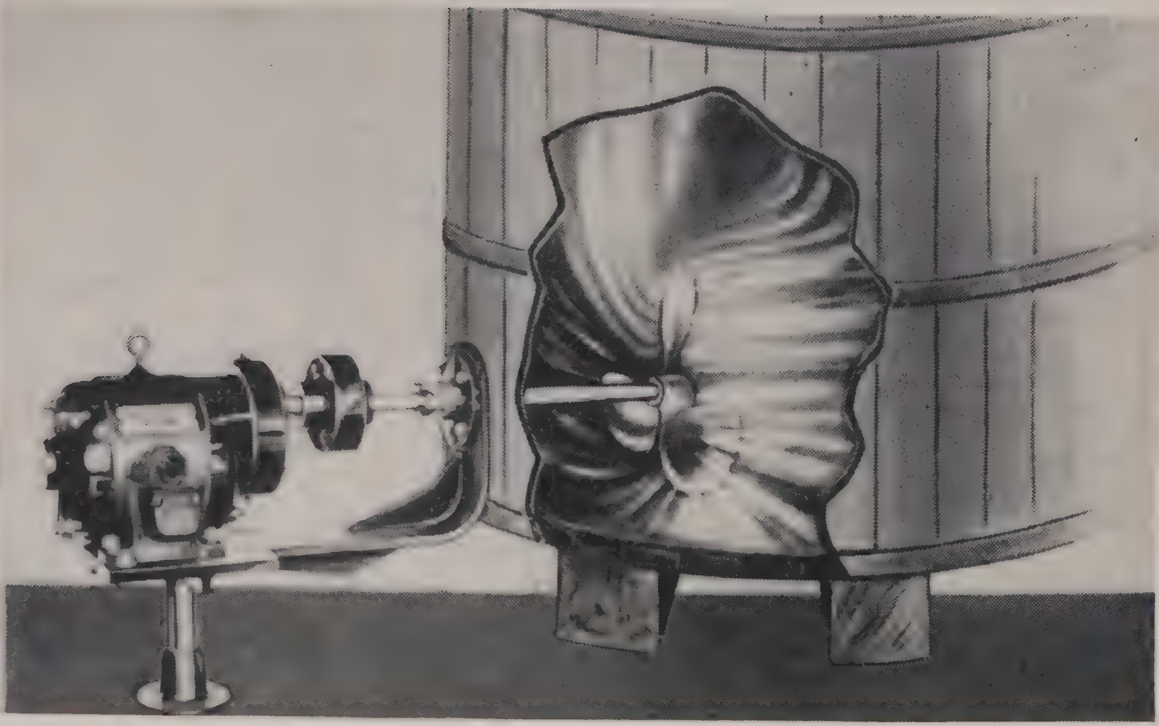


FIG. 16. **SIDE-ENTRY** propeller is recommended for mixing of low viscosity liquids in large tanks. Cutaway (above) illustrates the action.

reconstitution of dry milk and the preparation of ice cream mixes and of beverages from syrups.

### Jet and Spiral Mixers

The jet principle is employed for intimate mixing of liquids, or of a liquid and a powder, in the desired proportions. In the mixing of two liquids, the primary liquid entrains the secondary liquid as the former issues from a jet orifice at high velocity. The two are mixed (1) by turbulence resulting from the impact of the liquids, (2) the conversion from kinetic energy to static head, and (3) by friction between the streams and the eductor surfaces.

Entrainment ratio depends primarily upon the eductor design. Close regulation within the design limits is usually obtained by a valve in the pressure liquid line. A gear pump in the suction line can also be used to regulate proportions of the two liquids.

In the mixing of a dry powder with a liquid, the powder is fed from overhead directly into the nozzle throat.

These are many applications in the food industry for spiral mixers. Their widest use is with solids, but liquids are sometimes components of the mixtures. Generally, this type of mixer operates in the horizontal plane. However, some are operated vertically (Fig. 17) when used as blenders for highly granular materials, such as grains or coarse meals.

The mixing element in the horizontal units (Fig. 18) may consist of full helical ribbons, broken ribbons, or a combination of ribbons and paddles. The helical ribbons—one a right-hand screw and the other a left-hand—move the material back and forth from one end of the containing vessel to the other, at the same time lifting the material. The resultant action sets up a bottom-to-top, cross-current, and end-to-end movement of materials.

The blades on the ribbon are narrow because the mixing of solids or thin pastes requires constant slippage off the blades. This promotes local turnover and prevents packing of material.

Where the batch is heavy and presents great resistance to the agitator, alternate sections of the outer ribbon are omitted. In this manner, movement of the agitator through the batch is made easier.

There is another type of mixer in which the ingredients are fed continuously for the greater part of the mix-

## Spiral Mixers—Vertical and Horizontal

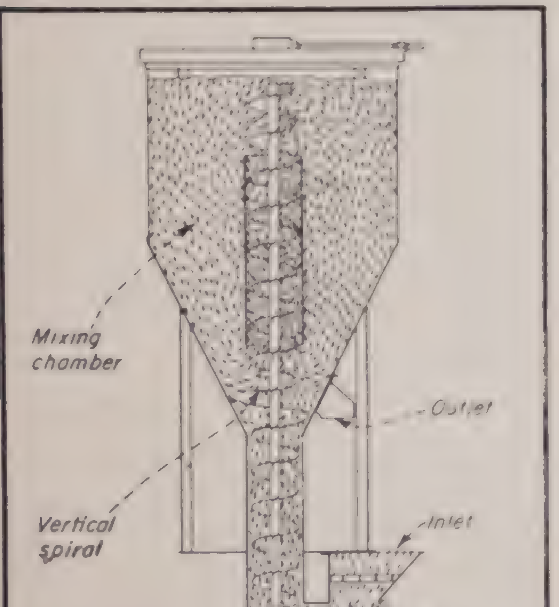


FIG. 17. **VERTICAL** spiral mixer is used for handling granular materials.

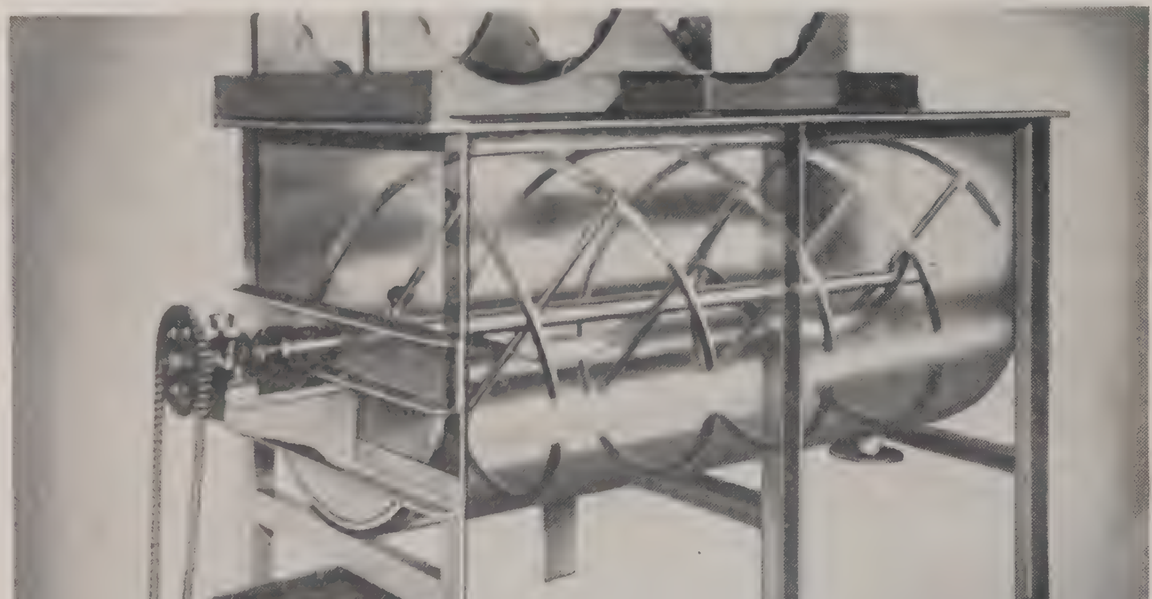


FIG. 18. **HORIZONTAL** type mixer is employed primarily for the blending of dry powdered materials. Thin pa-tes may also be run.

ing cycle. Used in the batch-continuous manufacture of processed cheese, the mixer is a horizontal trough approximately 15 ft. in length, with an oval-shaped cross section about 15 in. deep and 18 in. wide at the top.

Rotating inside the trough is a 10-in. screw having a 4-in. hollow shaft and 3-in. flights. Steam discharges continuously through inlets in the sides of the trough. Shredded cheese feeds into one end of the mixer and the flights force the cheese toward the discharge end. When the discharge valve is closed, the cheese flows back over the top of the screw to the inlet end. This action is continued until the cheese reaches the desired temperature.

Cheese is fed into the mixer for about 4 min. of the 6-min. mixing cycle. Continuous production is obtained by feeding ingredients from a common grinder to alternate mixers.

### Tumbling Mixers

Free-flowing dry materials often are blended or mixed without the use of an agitator inside the containing vessel. Rotating or tumbling motion may be applied to the containing vessel itself. Baffles or deflectors in the mixer will help to effect thorough intermingling of the materials. In some instances a rotating or tumbling mixer is equipped with rotating paddles to increase the mixing action.

The corners of the containing vessel are rounded to eliminate dead spots. In one of these mixers the vessel is made of aluminum, which combines light weight with corrosion resistance. This type of unit is very effective for uniformly mixing very small percentages of one element with a very large percentage of various elements having an appreciable difference in specific gravity.

**Acknowledgments**

**Photos and other illustrations in this report are credited as follows: Alsop Engineering Co., Figs. 15, 16; American Machine & Fdy., 1, 14; The C. O. Bartlett & Snow Co., 8; S. Blickman & Co., 18; Cherry-Burrell Mfg. Co., 6, 9; The Creamery Package Mfg. Co., 5; Consolidated Macaroni Machine Co., 3; The Girdler Corp., Votator Div., 4; Hamilton Copper & Brass Works, 11; Marco Co. Inc., 10; Peerless Bread Mach. Co., 19; Pfaudler Co., 7, 12, 13; The Safety Car Heating & Lighting Co., Entoleter Div., 2; and Sprout, Waldron & Co., 14.**

In another phase of mixing, liquids and solids are combined to form pastes, plastics and doughs. The components of this type of mixture are usually free flowing and easily handled individually. However, during mixing they form sticky, heavy, thick, and in some cases tough, masses.

Because of changes which take place during the mixing operation, the movement or flow of the mixtures becomes quite limited. The operation changes to beating, working, stretching, folding, kneading and even crushing. It is executed in batch lots to get the desired distribution of the component throughout the mass.

## Efficient Bars Do High-Speed Job on Doughs

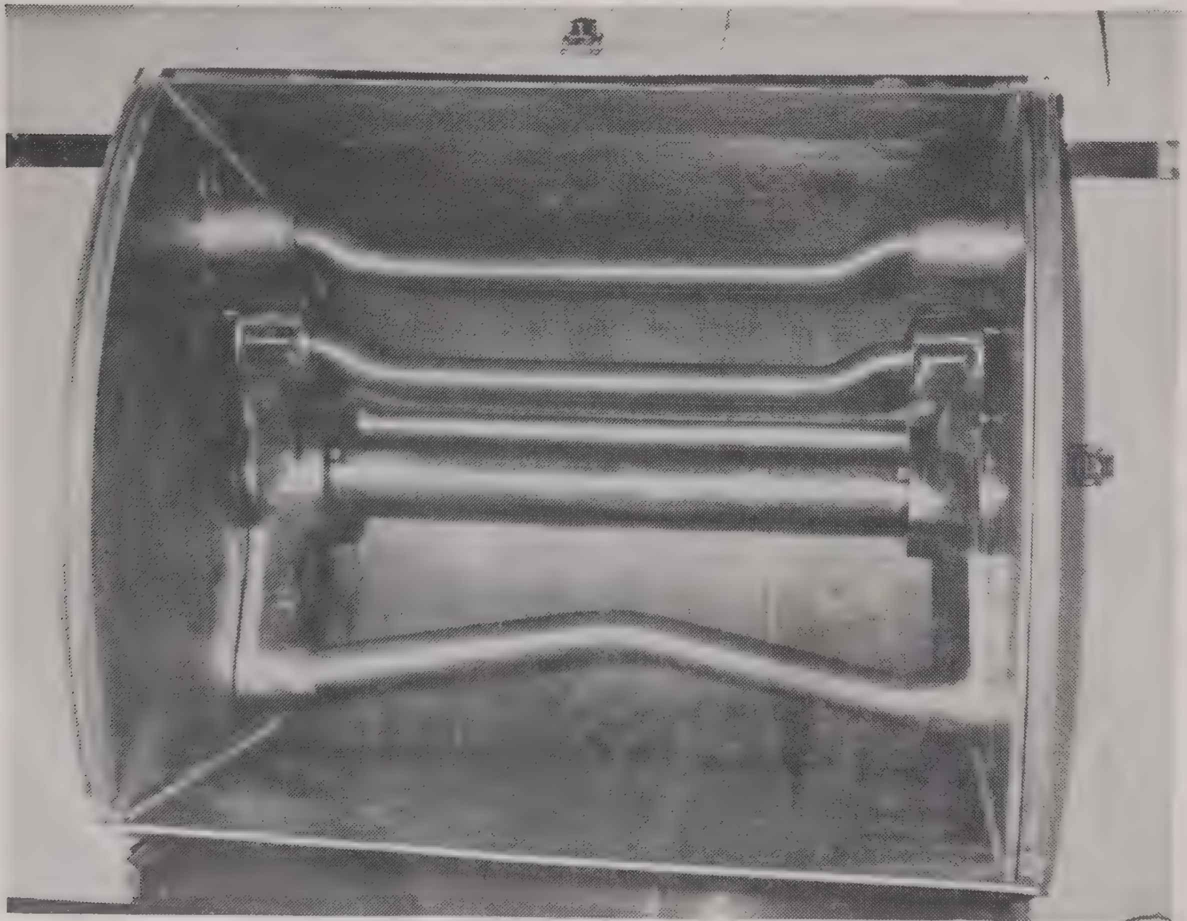


FIG. 19. CLOSEUP of bowl in high-speed bread dough mixer discloses arrangement of bars that condition the dough. Seams between stainless-lined ends and stainless-clad sheet are welded to eliminate contamination crevices.

Dough mixers may be vertical o horizontal. Vessels of the vertical mixers are generally bowl-shaped. Inside various agitator devices are operate to impart a mixing or blending movement to the ingredient components After the mixture reaches a plastic partially-mixed or dough state, thes same agitators impart the require beating, working or kneading action.

The agitators may be in the form o beaters, arms, hooks or cutters shape to impart to the different portions of the dough mass the type of action necessary to get a uniform mix. Operating action of the devices varies from simple rotation in a vertical plane to a combination lifting, stretching and folding. Simple rotation in a vertical or inclined plane is very likely to be accompanied with a whirling motion of the agitator or rotation of the bowl.

### Dough-Mixer Speed

These mixers operate at low, medium and high speeds. Many of them are equipped with variable-speed controls on both the agitators and the bowls. Capacities range from a few quarts to 175 gal. liquid volume.

Horizontal dough or heavy paste mixers are of two styles. Bent-arm agitators are employed for slow-speed mixing. They have a wide usage, ranging from the mixing and beating of sponges and batters to the mixing and kneading of chewing gum. These machines may have single-arm agitators or double-arm agitators.

In the double-arm mixers, the agitators usually operate at different speeds and in opposite directions. The object is to throw the mass from one part of the mixer bowl to the other with a rubbing, beating and tearing action necessary to distribute the ingredients and to cause absorption of the liquids by the solid components.

As for high-speed mixers, these have been developed primarily for the bread industry. They are in some instances referred to as dough conditioners. Here, the agitators are designed to give the dough the different degrees of rolling, folding, stretching and kneading to put the flour gluten into the proper hydrated and plastic condition for the production of loaf bread.

Fig. 19 shows a close-up of the bowl and agitator of a high-speed mixer. The agitator has a V-bar at the bottom to pull the dough in from the ends to the center of the bowl. Above the agitator shaft is a straight bar. A third bar swings to the lowest position to pick up the small doughs. In the upper back of the bowl is an offset swinging braker bar which takes the shock of the dough away from the back bowl sheet and folds back into the agitator.

StoAway
FROZEN FOODS

**ONE-HUNDRED** distributors are served by Holiday trailers that hold foods at sub-zero temperatures.

# Frozen Dough at 10 Below

## Rolls and chicken pies, packed and frozen at Arkansas plant, are trucked long distances to centers of distribution throughout the country

KEPT FRESH by freezing, dinner rolls, Parker House rolls, and chicken pot pies are delivered throughout the country by the Holiday Food Co. from its new plant in Van Buren, Ark. Two tractor-trailer units and one leased freight car handle this distribution, with only the Pacific Northwest not yet included in the company's territory.

Under the "Sto-Away" label, the three items are attractively packed for the consumers—in foil-wrapped cardboard boxes, 5 in. long by 4 in. wide and 1½ in. deep. For distribution, these items are packed in corrugated cases, 24 packages to the carton.

In its sales trips, the Holiday company makes direct deliveries to selected frozen food distributors. Some of these distributors have their own plants, while others use cold storage warehouse facilities. In addition, the company also maintains warehouse stocks in 40 cities for the convenience of its outlets in those areas.

For direct distributor deliveries, the refrigerated railroad freight car and the two road tractors with refrigerated, tandem-axle trailers are used. Two additional tractor-trailer units are on order and will go into service before the end of this year. The railroad car is claimed to be the only dry ice freight car under lease. Maintained inside is a temperature of minus 10 deg. F.

The automotive equipment at present employed consists of a White tractor with a single-axle Brown trailer, and a Federal tractor with a tandem-axle Gramm trailer. Each trailer is 32 ft. long and carries a payload of 29,000 lb. or 3,000 doz. rolls.

### Adequate Refrigeration

Both trailers are heavily insulated to maintain the same interior temperature as the railroad car—minus 10 deg. F. Fiberglas is the insulating material, with 8-in. thickness used in the roof and 6 in. in the sides, ends and floor. The refrigerating system, carried inside the nose of each trailer, is a Polatrol unit, made by the Trailmobile Co. of Cincinnati. The two new trailers about to be added are Browns, made by Brown Trailers, Inc., Spokane, Wash.

All of the automotive equipment is painted alike to provide a standardized appearance. Tractor hoods and cabs, chassis, fenders and wheels are finished in the special Holiday red, the same color that is prominent on the aluminum foil in which the three food items are packed. Trailer bodies, sides and roofs are of aluminum, and the wheels are in red, matching those on the tractors.

The trailer side lettering, including the trademark brand name of Sto-Away, is in the same form and coloring as used on the packaged food items, thus providing a tie-in between the product and the distributing equipment.

To date, the dry ice refrigerated railroad car has been employed to haul shipments to San Francisco. The remaining broad distribution area has been served by the company automotive equipment, with some off-route points reached by commercial motor lines. The latter agreed to use enough dry ice in transit to maintain the same −10 deg. as is maintained on the company's own equipment. Thus, uniform delivery conditions are assured.

The most distant cities served by the tractor-trailers are Boston in the north, Norfolk in the east, Miami Beach in the southeast, San Antonio in the southwest, and San Francisco in the west.

In all, more than 100 distributors are served direct by the company's own automotive equipment. The maximum one-way trip mileage of the tractor-trailers has been 2,200 miles. During 1948, each unit covered between 80,000 and 90,000 miles.

Holiday has licensed its tractor-trailers as private carriers under the Motor Carrier Act of the Interstate Commerce Commission. The company also engages in the brokerage business, buying return loads and selling them, thus reducing the distribution cost of its own products as well as providing a substantial additional income for overall company operations.

# Meat Prepackagers Battle Problems

But "posers" are seen fading as big consumer acceptance plays vital role in stimulating the needed know-how

**GEORGE GARNATZ**
The Kroger Food Foundation, Cincinnati, Ohio

Fresh meats are wrapped and sealed

then clerk puts them in display case

and consumer "helps herself"

Packaging of self-service meats is still in the pioneer stage, hence problems are arising—especially technical ones—that have not yet been precisely defined.

To understand and appreciate these problems, it is essential to have background knowledge and experience. Therefore, it is important to study how meats are merchandised in self-service departments and how new trends in consumer-size packaging have given impetus to this development.

Kroger's interest in this field dates back to 1941, when we began investigating the conditions pertinent to prepackaging—the factors of application, durability, appearance and visibility. Particular emphasis was placed on conservation of the freshness of meat in order to extend its sales-life and to deliver it to the consumer in a condition that would enable her to use it within a reasonable time.

Early in our work, we arrived at two conclusions: First, whatever methods worked out satisfactorily for beef could be applied to lamb, veal and pork. Second, however, we discovered that wrapping materials then available were unsatisfactory. Moisture-proof wrapping materials developed off-odor and discoloration, also there was formation of slime. Others that transmitted moisture vapor permitted dehydration and discoloration. Even so, at least one semi-moisture proof film offered promise, provided discoloration could be prevented.

At this point, we collaborated with the du Pont organization. And from this joint endeavor, cellophane film M.S.A.T. 80 was developed. It is heat-sealable and semi-moistureproof, with one side wettable and similar to basic cellophane. When the wettable side is applied to the meat, the color of the meat is retained for a sufficient time to make packaging practicable. Moisture-vapor transmission through this film is sufficient to control microbial growth satisfactorily, provided the packaged meat is properly refrigerated.

### Good Packaging Requires Care

This starting point inspired us to improve other packaging conditions via these specifications: (1) Maintain the cutting room at 56 to 60 deg. F., (2) expose cut meat to the atmosphere at least 15 min. to develop optimum color prior to wrapping, and (3) stiffen the package (in instances where necessary) with a backing board or tray—selected to prevent "pan-burning" and accumulation of meat juices.

In addition, the packaged meat had to be displayed at 30 to 34 deg. F. It was pointed out that saleable-life was critical unless a 40-deg.-F. holding temperature was observed. Furthermore, temperatures short of freezing significantly prolonged the appearance and freshness of the product. Through careful adherence to these specifications, a saleable-life of 72 hr. was attained and the consumer had reasonable time to prepare the meat.

By using L.S.A.T. cellophane and applying the above precautions to cured and ready-to-eat meats, these products could be satisfactorily packaged, though there was still the factor of subsequent discoloration. Soon it was recognized that light contributed to discoloration. Many of the wave lengths in the visible spectrum, as well as those in the ultra-violet range, caused color fading.

It was learned how low light intensity, use of "soft white" fluorescent tubes, and low holding temperatures combined to minimize color fading. But since the role of oxygen was overlooked and an opaque package was not considered acceptable merchandising-wise, packaging these products in transparent materials was undertaken notwithstanding the color-fading handicap.

On such general and empirical bases, our organization instituted experimental merchandising in 1945. And despite the limited availability of equipment, progress has been made, so that we now have 21 complete and 400 partial self-service units in operation.

### What Consumer Surveys Show

Experience thus gained indicates that, properly handled, meat packaging offers promise for successful application of self-service fundamentals to meat merchandising. It has been found that the consumers' acceptance of packaged self-service meats is very favorable. A preponderant number prefer to purchase meat in this manner because the service is faster and more convenient. They say it is easier to make a selection from the wider variety available in the more complete display cases. Moreover, the consumers say they can select the cuts desired in the sizes needed at the prices they can afford.

Subsequently, a survey indicated that 58 out of every 100 consumers purchased packaged meats at a self-service market. Further proof of consumer acceptance (based on our experience) is that after conversion to the prepackaged, self-service meats, a 94 percent increase in dollar sales resulted, or a 49 percent increase in tonnage.

Still further evidence of this merchandising appeal may be noted from these indices: Before conversion, percent of meat sales to total sales was 26 percent. And after conversion, it increased to slightly more than 32 percent. Along with the aforesaid 94 percent rise in meat-dollar sales, there was also an accompanying 46 percent increase in the dollar sales of groceries and produce.

It is interesting to note the increases, attributed to packaging and self-service, among different items in the meat department. The following pertinent breakdown is based on a tonnage percentage of the individual items to the total tonnage of the store:

| Item | Percent Before Conversion | Percent After Conversion |
|---|---|---|
| Poultry | 4.0 | 16.0 |
| Veal | 2.5 | 10.8 |
| Sausage | 8.6 | 11.2 |
| Bacon | 7.3 | 9.6 |

### About Prepackaging Costs

Even at this early stage, the practicability of packaged meats in conjunction with self-service is manifesting itself. The percent of wages to sales starts out a little higher than before conversion. But with experience, improvement is achieved through greater efficiency. And in a relatively short time this wage difference no longer exists between self-service and service operations.

Cost of wrapping material per pound of packaged meat is significantly higher than for meats handled in the service department. But in time, and with careful study, economies can be brought about so that the per-pound cost of selling on the new basis need not be more than 8.4 percent greater than the old way. Experience over a sufficiently long period proves that packaged self-service meats are no passing fancy, since the volume of sales shows a healthy trend.

It is evident that packaging must be done by the retailer, rather than the packer, because of the limited life of fresh meats and of the importance of bringing them fresh to the consumer. We do not imply that the meat packing industry need have no interest in these packaging developments. As an important member of the producer-packer-retailer team, the packer definitely has a stake—whatever the outcome of packaged meats. Then, too, because of his experience, know-how and facilities, he is in an excellent position to make contributions designed to improve packaging practices.

### Tech Problems Will be Solved

It is difficult to outline all the problems requiring attention, especially those involving the science and technology of meat. However, it is our observation that those who package meats as a merchandising operation are engrossed with the mechanics involved. And for the moment, at least, they are content to use such technical specifications as already outlined.

Undoubtedly, there will be more clarity concerning the technical problems when experience becomes more extensive and perception more sensitive. That these technical problems will be satisfactorily solved can be anticipated with a measure of confidence. In all probability, their solution will aid the economy and practicability of the operation, and also the quality of the product.

Currently, the retail distributor of meat who is converting to packaging and self-service finds that he is involved in production and distribution. Consequently, he must study layout arrangements for cutting, holding and packaging. Efficient use of labor and mechanization of operations must be considered. He must also take into account: (1) Minimum work space, (2) smooth production flow, (3) volume output, (4) practical and effective packages that will stand up under consumer handling, (5) economical use of packaging materials, (6) simplicity in the packaging itself, and (7) marking and applying labels.

### Where Should Meats be Packaged?

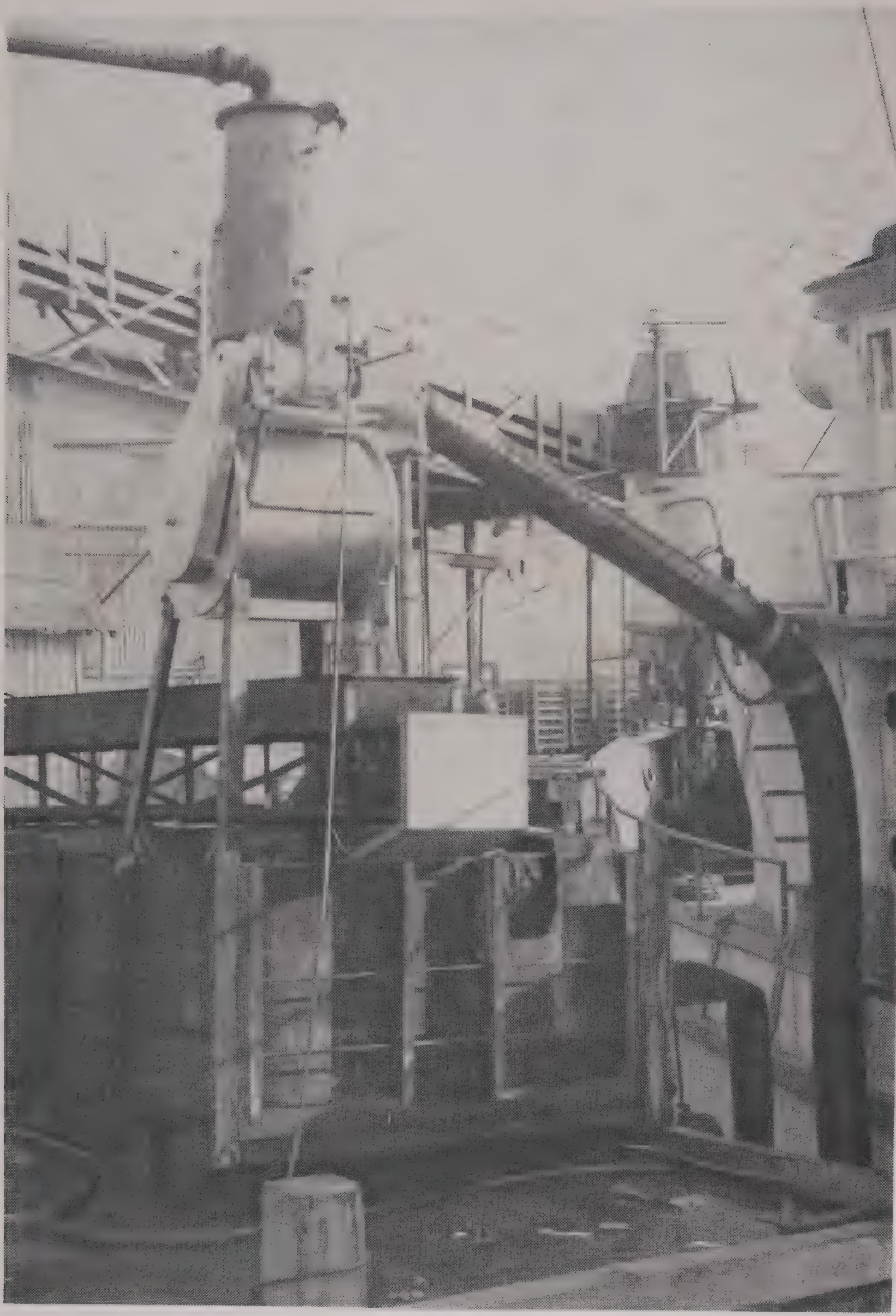
Coming fast on the heels of such problems are questions like these: "Shall packaging be done in the retail store?" "Shall it be carried out in a centralized unit (warehouse) serving a number of stores?" "Or shall it be conducted by a 'team' servicing several stores on a 'circuit-riding' basis?" At the moment, preference favors the store operation.

Somewhere in the sequence must be answered the question as to the minimum size feasible for such a retail outlet. On the weekly-receipts scale, opinions vary between $1,000 and $3,000. Our experience, however, indicates that a store doing not less than $3,000 per week is better suited to packaging and self-service than smaller ones.

Keeping in mind the factors that favorably influence the consumers' choices of packaged meats, detailed practices must be worked out to provide them with cuts in sufficient variety, in the sizes needed, and at the prices they can afford. One also must bear in mind that the meat packaging must be synchronized with merchandising to get proper rotation and adequate turnover insuring quality and freshness. These problems receive priority.

Technical problems are not grossly apparent, either because what has been roughed out is adequate or because certain limitations are accepted under the expediency of getting things under way. Undoubtedly, better packaging materials and methods will become available. They will

(*Turn to page* 192)



**FROM BOAT**, fish travel up suction hose (right) and are discharged through rotary valve (center) to plant belt-conveyor directly beneath.

# New Hydra-Vac Lift Speeds Fish Direct From Boat to Cannery

## Moves up to 150 tons of sardines per hour and brings big saving in manpower

**TOM CAMERON**
"Food Industries" Special Correspondent,
Los Angeles, Calif.

Service tests of a new type pump apparatus for conveying fish—or other foods which may be handled in liquids—have been successfully completed at California Sea Food Corp., of Long Beach. This Kimmerle Food Pump System, as it is called, can transfer 50 to 150 tons per hour. And the labor saving is notable.

Heretofore, sardines have been unloaded from boats by various means—most commonly, however, with the use of the pursed net and hoist. The net is attached to a metal ring of about 40-in. dia., and to this ring is fitted a long heavy-wood handle. With the aid of this handle, workers guide the net, pushing it like a scoop into the fish in the boat's hold. Attached to the ring is a cable, leading to the powered hoist. Thus, the loaded net is lifted to a position above a receiving hopper or conveyor, and a worker releases the bottom of the pursed net to empty the fish.

But this method of doing the job requires a minimum of four men—whereas with the new pump equipment only two men are needed, one to tend the unit and handle the crane supporting the weight of the hose, and the other to work the receiving end that picks up the fish.

### How It Works

Designed and built by Pearne & Lacy Machine Co., Los Angeles, the new system comprises a vacuum pump hooked up with a rotary valve unit that incorporates six product-holding chambers. The suction-line vacuum is preserved by each chamber until it has been rotated to the unloading position.

In action, sardines in the hold are picked up by an 8-in. rubber suction hose and are hydraulically conveyed upward to the rotary valve. Here, after rotation of the compartments, the vacuum is released and the fish and water drop through the discharge port.

The fish fall onto a conveyor belt that moves them into the cannery, and the water is returned to the hold of the boat to be recirculated through the system.

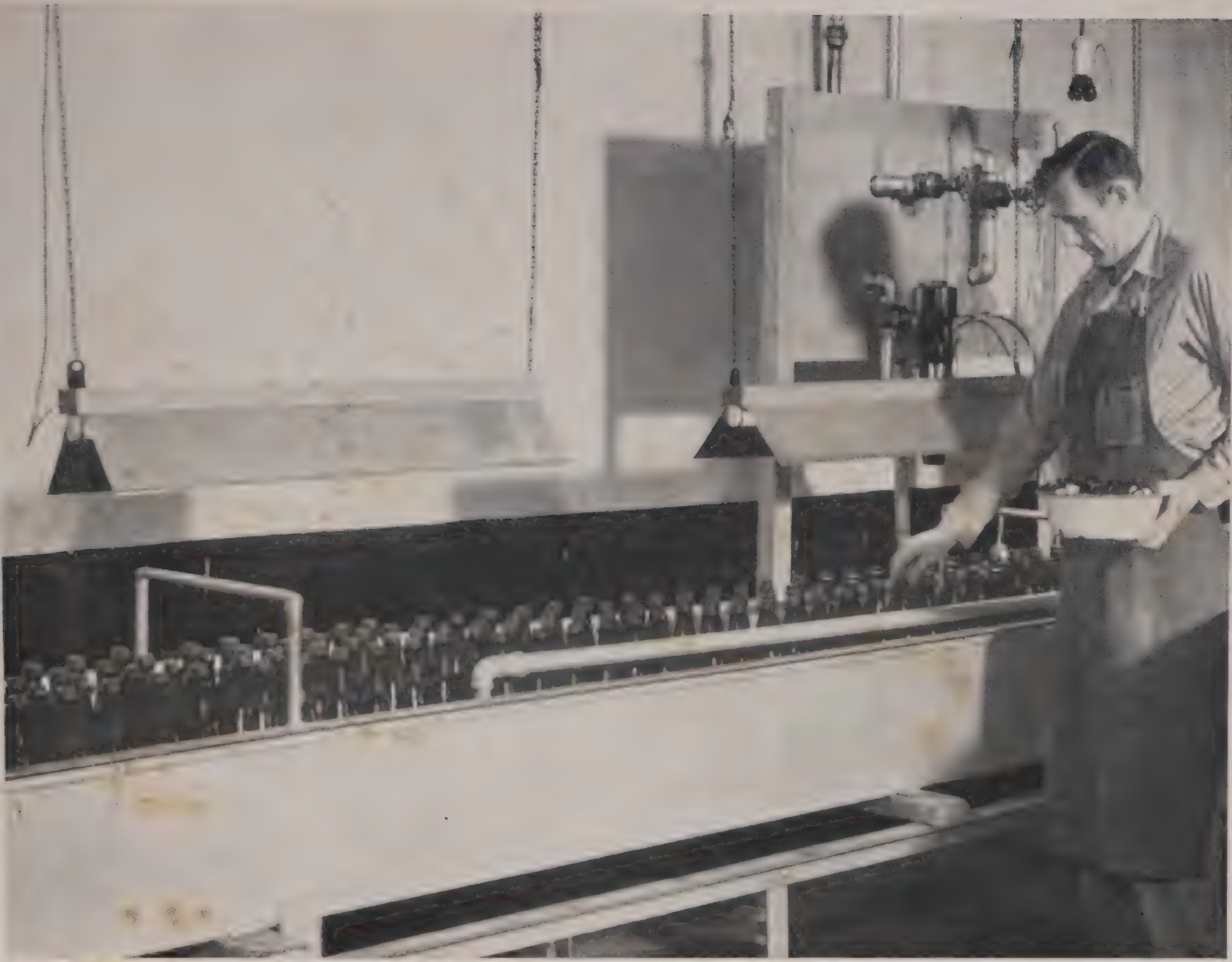
### Needs No Priming

Operating at a rate of 300 cu. ft. per min., the pump quickly evacuates the suction hose. No priming is necessary. The 2 hp. motor powering the rotary valve is started simultaneously with the 15 hp. pump motor, and the system begins immediate delivery of fish. It has efficiently lifted fish 22 ft. above hold level.

The special rotary valve turns slowly—10 to 30 rpm., as desired—hence, the fish moving through it are not damaged. In contrast, the conventional rotary pump and hose unit—which has also been employed—operates at higher speed, since it must handle both suction and "pay-load."

Only a small proportion of water is required by the new system. As little as one part water to four parts of the material conveyed is sufficient to carry the load.

For optimum pick-up performance, the suction hose is flared to 10 in. at the intake end. A worker moves about in the boat hold with this free end, directing it into the piles of fish until all have been transferred.



**HANGING** over pasteurizing trough, a bank of 30w. germicidal lamps in concentrating reflectors produces intense ultraviolet "blanket." During this pasteurization, wines breathe, and lamps provide sterile air.

# Germicidal Lamps Raise Product Quality

Wine fermentation is speeded, alcohol losses reduced. And curbing of contamination improves operations all along the line

**J. WAGNER, JR., and I. MATELSKY**

Wine Maker, John G. Dorn Co., Sandusky, Ohio; and Bacteriologist, Lamp Department, General Electric Co., Nela Park, Cleveland, respectively

Wines produced under germicidal lamps ferment faster, have a minimum increase in volatile acids, and less alcohol loss. Further, the lamps are effective in inhibiting the spread of bacteria, mold spores, and yeasts, that are commonly air-borne in wineries.

These facts were evidenced in our experiences with germicidal ultraviolet irradiation as it was used (1) for air disinfection as an adjunct to the normal procedures of plant sanitation, and (2) for product protection and control of undesirable factors during the period encompassing the various operations in producing a stable, finished wine with desirable characteristics.

The methods for application of this energy were determined by our experiences with ultraviolet in other fields, and by laboratory scale experimentation.* The results were so favorable that larger volumes of juices and wines were set up in a pilot-plant installation.

Because of the large quantities involved, all controls were limited to minimum increases in undesirable developments, such as increase in volatile acids with subsequent loss of alcohol through prolonged fermentation periods. Consequently, the results described below are in terms of rate of increase or decrease, as noted in the various analyses.

### Installed in Crushing Room

Pilot-plant preparations were completed and ready for the first crushing in 1947. The germicidal lamps—15w. G.E. units set in concentrating Alzak aluminum reflectors—were suspended over the crusher, stemmer, press, and wherever the juice was exposed to the air for any period of time.

Thus, all air coming in contact with the grapes was disinfected from the time the grapes entered the crushing room until they passed through the

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* In laboratory at Dorn Wine Co. and in Product Protection Laboratory at Nela Park.

## Clear from Rim to Rim—Lamp Gets the Credit

No 114
2350G

**SURFACES** of liquids in the open sedimentation tanks are kept free of growths when irradiated by lamp (arrow).

crusher and stemmer. The lamps were always carefully positioned to guard employees against face or eye-burns. The units were either set below eye level or other means were employed to "mask" them.

Using a Luckiesh-Holladay-Taylor Electrostatic Air Sampler, air was tested before, during, and after crushing, and these samplings showed that the increase in the bacterial, mold spore, and yeast content of the air was negligible throughout the plant.

### Walls, Ceilings Cleaner

Further indication of the lamps' effectiveness in inhibiting the spread of microorganisms was the subsequent very marked reduction in mold growth on the walls, ceilings, and exterior surfaces of the storage cooperages.

After the juice was extracted and poured into open vats for sedimentation, the surfaces of the juice and also the sides of the vat were constantly exposed to the radiation of a 15w. germicidal lamp. This proved to be the first yard-stick in measuring the ultimate success of the entire experiment. First, the surface of the juice remained free of any film yeasts. Second, there was no mold film on the sides of the receiving vats, as is usual with varying levels of liquid.

Since closed fermentors were three to four times as large as the must vats, an attempt was made to prevent growth on all inner surfaces of the fermentors during successive fillings.

Two closed fermentors of 5,000-gal. capacity were filled simultaneously. During the filling, a 15w. germicidal lamp was suspended in each. After filling, the lamp was removed from one fermentor, thus making it a "control." Then, about 6 in. of space was allowed in each fermentor above the liquid for the early stages of fermentation. Also, a 2-in. opening in the top of each allowed gases to escape and air to enter. The volatile-acids content of each before fermentation was .03g. per 100 c.c.

At the end of twelve days, the rate of fermentation in both fermentors was very slow. A bubble-jar seal was placed in the top opening of both fermentors to prevent air from entering. By this time, the irradiated fermentor had developed 12.8 percent alcohol with a volatile acidity of .036g., while the control had developed only 12.0 percent alcohol with a volatile acidity of .06g.

At the end of 15 days, the control fermentor reached a completed fermentation, with 12.5 percent alcohol and with volatile acidity remaining at .06g./100 c.c. (see table, next page).

The comparison of the two fermentors showed that as the volatile acid content was increased, the rate of fermentation was retarded, with an increase in alcohol loss. Cessation of increase in volatile acidity after the air supply was sealed off indicated that these acidities were caused by aerobic side fermentations.

Although the same air-borne surface-growing microorganisms had access to the irradiated fermentor, there was no increase in volatile acidity other than the amount expected from evaporation of the fermented juice and from some slight oxidation of the alcohol present.

Advantages of ultraviolet irradiation during the various operations before and during fermentation were more evident when wine was made from scarce varieties of fruits which must be handled under adverse conditions, such as processing of small quantities, long periods of time between arrivals at the winery, and varying levels in the fermentors.

### Simplifies Storage Tank Operations

It is often impossible to use the entire contents of one storage cask at one bottling or "drawing" operation. To avoid excess air (because of the contaminants it may carry), usual practice is either to remove the remnants to smaller cooperages and barrels, or to add chemical preservative or disinfecting agents, which invariably alter the quality of the wine.

As an alternative measure, a bare 15w. germicidal lamp was operated continuously in a storage tank immediately after the first draft for bottling. And during a period of three months, five drawings were made from the cask until it was empty. Result: Despite the fact that large quantities of air were admitted with each drawing, there was no evidence at any time of the growth of surface microorganisms or any subsequent deterioration of the wine. Analyses and taste tests indicated no change in quality.

Consequently, the lamps were installed in all the storage tanks of one cellar. Outside each tank, an indicator light was hooked into the circuit to show immediately any lamp failure.

Filter and measuring tanks have been common sources of much contamination of wine. Wood tanks are still used extensively. They have an uneven surface and are most difficult to clean. The wine level in the tanks is first raised and then lowered, and the wood absorbs a small amount of wine.

As the wine is withdrawn, this small amount, retained by the wood in a great deal of air, creates conditions similar to those of a vinegar generator. Washing the surface of the wood does not eliminate the steady rate of deterioration between different batches of wine. And long exposure to steam sterilization causes rapid deterioration of the tank, while chemical methods frequently cause wine to absorb an off-taste.

Germicidal lamps were permanently installed in six filtering, fortifying, and measuring tanks. The ballasts and starters were installed outside the tanks, and indicator lights were set up. Results were very satisfactory.

### Films Don't Form

Several hundred different amounts and kinds of wine have now passed through these tanks over a period of 18 months. In a few cases, if unusual amounts of air were stirred into the wine in the transfer operation, there has been evidence of some deterioration. It was most evident in such cases where the wine was cold and the air was absorbed for longer periods of time. But at no time has a yeast or mold film formed on the surface.

The rate and extent of deterioration indicated that the activity of bacteria had taken place below and beyond the penetration factor of the ultraviolet rays and only to the extent of the available oxygen absorbed from the air.

All must tubs, after use, are thoroughly scrubbed and washed. Wooden tubs are usually kept filled with water to maintain their seams in water-tight condition. Diffusion of nutritive material from the pores of the wood makes the surface of the water an ideal medium for growth of undesirable organisms. This necessitates frequent rewashing and refilling. Today, water surfaces in these tubs are kept free of growth by 15w. germicidal lamps.

Storage tanks, too, when empty are subject to attack by many of the fungi, with the resultant "souring." But now lamps kept in continuous operation keep these empty tanks free of the miscellaneous fermentations.

### Pasteurization Also Aided

Many wines must undergo a process of pasteurization. And because most of them are sensitive to effects of heat, extreme care has to be exercised in controlling the temperature of the water bath. Since a bottle of wine undergoes substantial "breathing" during the heating and cooling stages of pasteurization, a bank of 30w. lamps in concentrating reflectors was mounted over the pasteurizing trough to give an intense ultraviolet blanket.

With this method, it was possible to seal the package in disinfected air and at average temperatures, minimizing the need for a perfect seal either under high pressure or vacuum. It is notable that sample bottles, including some with light wines, have held up under marketing conditions for more than a year.

We have attempted the pasteurization of the wine itself with germicidal ultraviolet. True, we have had only moderate success to date, but we are continuing our attempts in this field.

As an added measure of sanitation to reduce the general air contamination, 30w. lamps have been mounted on the ceilings of several of the cellars. This has brought a remarkable decrease in mold growth—and considerable savings in maintenance as a consequence.

## Control Test Demonstrates Value of Irradiation

**TABLE—TREATED AND UNTREATED** wines compared on basis of their development of volatile acids and alcohol.

| Days of Fermentation | Volatile Acids g./100 c.c. |  | Alcohol Percent |  |
|---|---|---|---|---|
|  | Irradiated | Control | Irradiated | Control |
| 0 | .030 | .030 | 0 | 0 |
| 3 | .030 | .036 | 6 | 6 |
| 6 | .030 | .042 | 10 | 9 |
| 9 | .033 | .048 | 12 | 11 |
| 12 | .036 | .060 | 12.8 | 12 |
| 15* | .036 | .060 | 12.8 | 12.5 |

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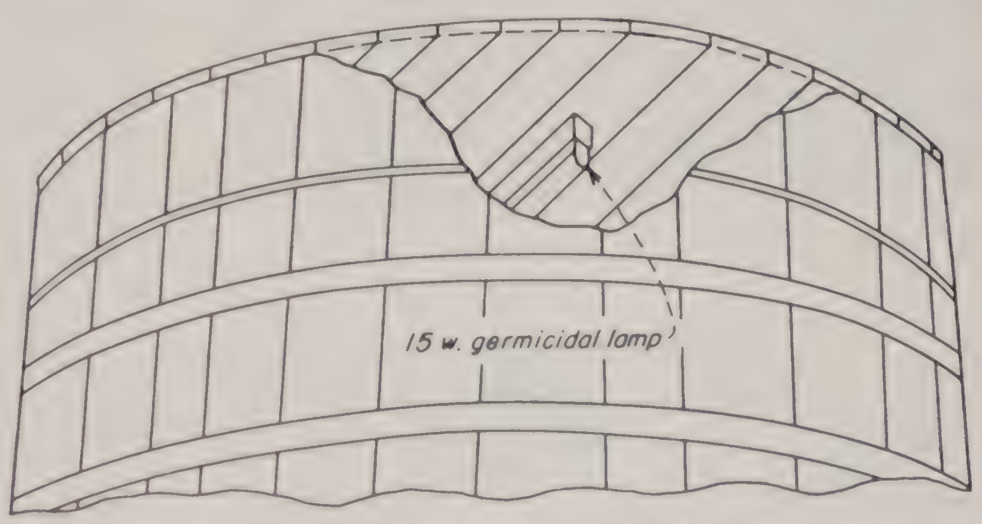
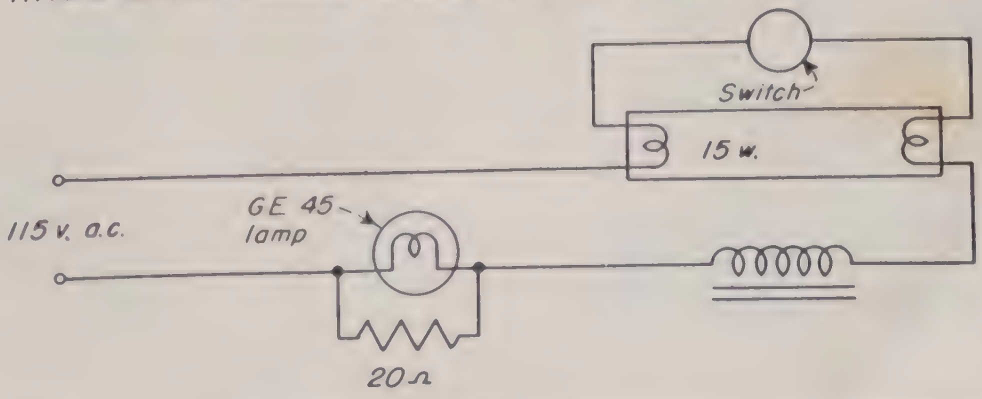
* Air supply closed off.

How Germicidal Lamp is Fitted Inside Cask...



...And Circuit Hooked Outside to Warn of Failure



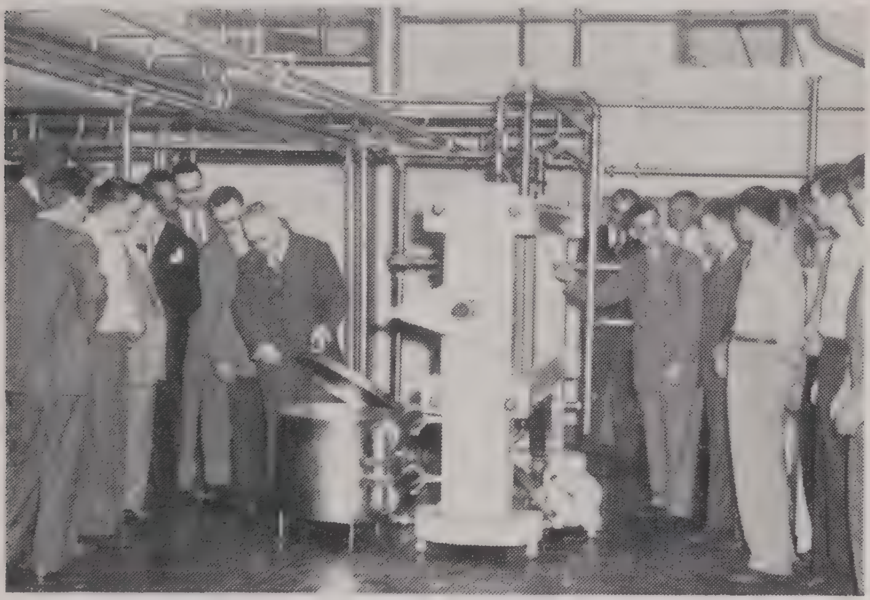
1 **WELCOMED** by company officials, a new group of plant men and salesmen is started on training program.

# They Meet Compan Before the Job

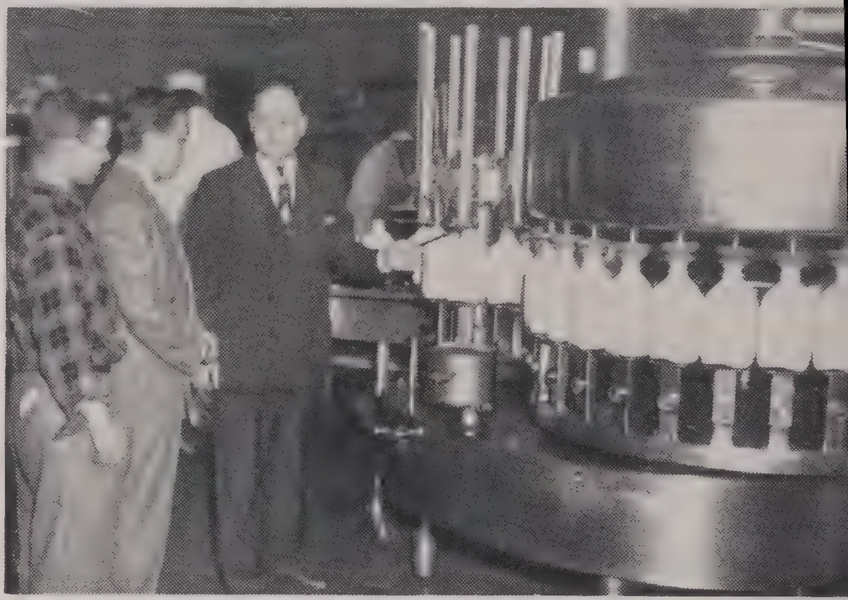
## Salesmen as well as plant employees ar introduced to Bowman's complete operatic before tackling their specific tasks

GEARED to make new employees "better earners soone Bowman Dairy Co., Chicago, has set-up an intens four-day training program for beginners in the plant a on sales routes. Plant men are familiarized with fi inspection, cost and care of equipment, plant cleaning a operations, bottle washing, and the like. These new peo actually put in about 2½ hours' work before taking o the jobs for which they were hired.

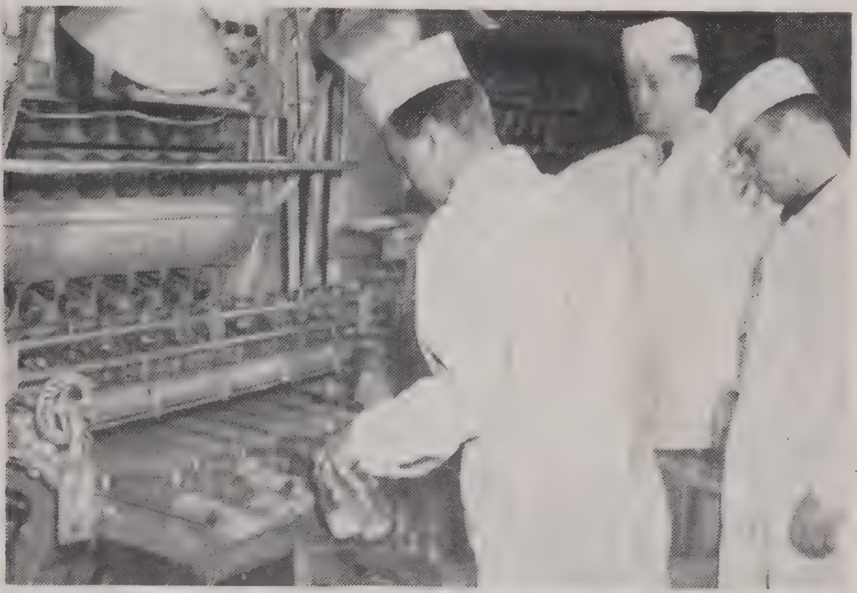
These pictures show some of the steps involved in int ducing a new employee group to the inner works of o of the company's city plants.



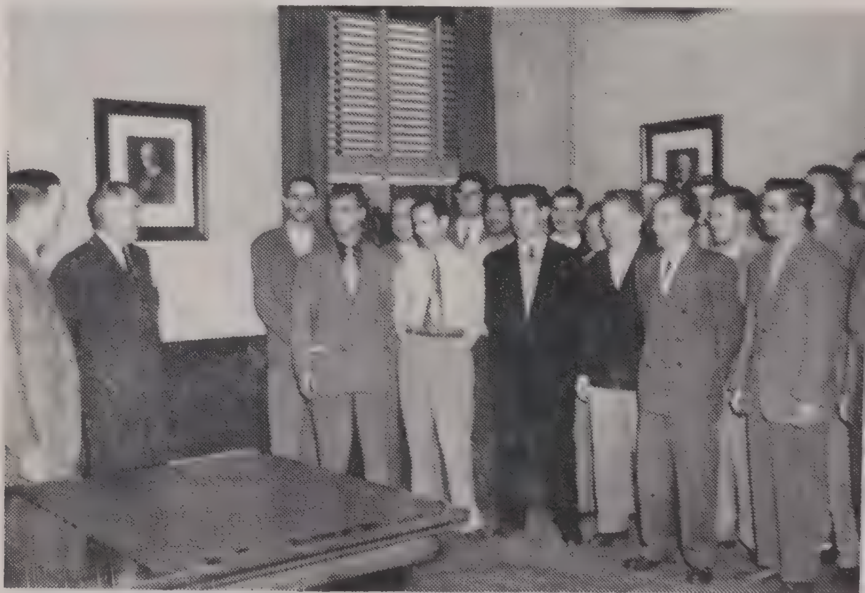
2 **EQUIPMENT** is explained on first plant tour. Here, a cooling unit and sampling vat are being studied.



3 **DETAILED** explanations of different units are next i order. In this case, two plant trainees study fillers



4 **READY** for action, same two men get started at bottle washer under qualified supervision.



5 **END** of course finds entire group being commended by two of company's top-ranking officials.

# We Think . . .

## ■ Food Processors Ought to Beat Politicians to the Punch

Senator Gillette made the headlines throughout the country with his charge that food processors and distributors either are inefficient in their operations or are exacting an inordinately high profit. To answer this charge, insofar as processors are concerned, it is only necessary to cite the average profit for the industry. It has been running at approximately 3c. on the dollar of sales. Profits vary, of course, for different firms. But none is exorbitant, and some are less than nothing. So taxpayers might have been spared the expense of the government's food-price inquiry if the Senators had taken the trouble to study food-company financial reports. But that would have deprived the politicians of the headlines which come from making a political football of the food industry.

However, it is not the purpose of this piece to prove that Senator Gillette's charges are cockeyed. That already has been done by executives in the industry who were called to Washington to be put on the grill. Two heads of large dairy companies, for example, explained that their profits amounted, respectively, to only 2.57 and 2.95 percent of sales. In one case, the profit amounted to 7½ to 8 percent on the investment if figured at book value, but would be perhaps half that much if realistically based on replacement value.

But as we said, we didn't start out to argue with the Senator. The point we wish to make is that people don't know that charges of exorbitant profits are false when they read the headlines. They don't know because no one has ever told them the facts. That is where food processors long have fallen down in their public relations activities.

Since the food industry is a favorite football of politicians, food processors often take the rap for high food prices resulting from high farm prices, high labor costs, high freight rates, high equipment and supply costs, and high taxes. Everyone in the industry is aware of this, yet nothing much has been done to put the facts before the public—except to testify before investigating committees.

Why don't food processors educate consumers through their newspaper, magazine and radio advertising? Why don't dairy companies occasionally hang an informative tag on the necks of milk bottles delivered to the door? These media of contact with consumers should carry facts about raw material, labor, distribution and other costs—as well as profits. Food processors have nothing to hide. Their profits are puny compared to what consumers think they are, or what would be considered fair and just. Consumer-opinion surveys have shown that a profit of 10 or 15 percent is not frowned upon as unreasonable.

If provided occasionally with facts about costs and profits, consumers would know when politicians were talking through their hats about exorbitant profits. Then smart politicians would be more careful of the truth. And government agencies might think twice before they tried to crucify a food company, such as A & P, or a whole branch of the industry, such as milk processing.

Given the real facts, the public essentially is fair-minded. But the uninformed too often will let the bird on the soapbox make up their minds for them.

## ■ F&DA Should Be Given the Facts Without Use of Subpenas

If Congress should enact the legislation proposed in H.R.4572, the Federal Security Administrator would have the privilege of compelling unwilling witnesses to testify at hearings and bring all necessary records and documents with them.

Legal advisors of the food companies are very rightly concerned that so drastic a power of subpena should be given. They fear that unreasonable use of the power might at some time become a serious matter to some individual or some company. With the trend continually toward greater Washington interference with business, we share that fear. Some day we may have a Federal Security Administrator or a Food & Drug Commissioner who cannot be entrusted with that right of subpena.

There is one way in which the food industry might forestall enactment of such legislation. It can exert influence to bring important witnesses, with all essential facts, to government hearings so promptly and with such full cooperation that there will be no need for the law.

If the executives of F&DA make it clear that certain witnesses seem unwilling to come, the risk of adverse opinion among others in the industry affected usually would suffice to bring the recalcitrant individuals to hearings, with adequate, pertinent facts.

## ■ Enlightened Labor Relations Essential to Efficiency

Occasionally, food company executives and technologists find themselves in a peculiar predicament as they plan technologic changes. Some improvements they would like to make are difficult because of labor contracts. Such cases occur, for example, when the union agreements fail to include provisions recognizing the right to install labor-saving equipment, or when there is actual prohibition against laying off employees whose services are no longer needed when new processes or new machinery are developed.

Perhaps even more frequent are the minor grievances caused by failure of foremen to satisfy union representatives regarding assignments of workers to new machinery as compared with old. Not uncommon is the difficulty involved in seniority selections when some of the older employees of trade groups appear less able to run new types of equipment than their younger and more alert fellow workers.

Every company executive, from the top officials who deal with labor problems down to the foremen who supervise operating groups, must be alert to the difficulties and be acquainted with the remedies for these problems. Small difficulties improperly handled often grow to alarming proportions. One way in which to start education of management at all levels is to study the varied provisions which have resulted from collective bargaining in many establishments.

The mere knowledge of the types of rules which are applied elsewhere will suggest most of the remedies needed in a new plant contract. Some of these must be made at the time periodic renegotiations of union contracts occur. Some must be observed from day to day as technologic change occurs or is considered.

One convenient start on such a program of education is a study of a recent booklet of the Burea Labor Statistics—*Collective Bargaining Provisions; Un Management Cooperation, Plant Efficiency, and Tec logical Change.*

It will be well worth while for every food company get copies of this booklet from the Superintendent of D ments, at the Government Printing Office.

The 20 cents per copy is a small precautionary investm to prevent complications of major magnitude in y relations with your workers.

## Fishery Situation Teaches Lesson in International Economics

"Unhappy" is a mild word for the current situation in the New England fish processing industry. Many plants are operating with skeleton crews while large quantities of processed fish from Canada come into the market.

It seems that the fishermen's union has limited the catches of the New England fishing fleets, has delayed sailings, and has shortened the time boats are out on the "banks." The object: To hold up the price of fish and boost the fishermen's "take" on the catch. And the reduction in the catch resulting from union finagling has been made worse by a 25 percent cut in the size of the fishing fleet. This cut represents the boats sent to Germany to help that country increase its food supplies.

The seafood worker's union, whose members man the processing plants, has not helped the situation. It has jacked the wage rate to $1.50 an hour against 84c. in Canadian fishery plants, and has topped this off with a guaranteed 40-hour minimum work week—fish or no fish.

Here are the economics of the situation: Whole haddock, to take one fish as an example, was selling for 5c. a pound as landed at Canadian ports. But the same fish cost 9c. when brought to Boston by an American fishing boat. With an average fillet yield of 40 percent, haddock fillets were worth only 12½c. a pound in Canada, compared to 22½c. in Boston. Add to the Canadian cost the shipping charge of 1½ to 1¾c. a pound and the import duty of about 2½c. a pound, and the Boston fish still couldn't compete.

Some in the industry want a tariff high enough to protect them against Canadian competition. Wiser o don't want such protection—and not because they want help balance international trade, either. They realize t a high tariff would make fish so expensive in New Engla that consumption would fall off seriously—to the lo range detriment of the fisheries.

This situation is an excellent demonstration of wh happens when labor unions "take over" an industry. Th shove the cost of the product so high that the market f it is limited—and who gains? In this case, the workers a business men of another nation are the beneficiaries.

The mess in the New England fish business also illustra the kind of problem domestic industries face as the Unit States takes steps to double imports so that they equ exports. No one will question the necessity for balanci international trade. But people in a lot of industri shudder at the thought of trying to pay the wages d manded by organized labor and still competing with pro ucts from foreign factories which pay workers little mo than half as much.

There is a fighting chance that the situation can met if American labor will be reasonable in its deman and its workers will pitch in and really do an honest day work for their money. With the advantage of more high mechanized plants, American food processors can pa relatively high wages and compete in free world markets- organized labor and farm-price support programs pe mitting.

## The Price of Neighborliness Is Not Too High

Food processing plants are fine sanitary establishments, or they all should be. But many of these works must inevitably create odors, and some of them have dust and fume effluent which escapes into the air or is blown up the furnace stacks. Not infrequently the resulting odors and air contamination involve problems with the neighbors.

Some of these problems are easily solved. They are the kind which relate to fume, dust or odor escape which is readily prevented by proper technical planning and careful operation. Whether the odors and dust are harmful and unpleasant, or merely are noticeable in the neighborhood, there is little ground for neglect of the simple precautions which prevent controllable escape. Even a pleasant odor may become something of a nuisance to the neighbors if it is too frequent or too strong. Ventilating systems with proper means for disposal of the odors and fumes collected should not be considered mere luxury or extravagance.

Less simple are the problems of unavoidable odor and dust. One cannot expect that a fat-rendering establishment or large animal slaughtering house can be made wholly odorless for the neighbors. But there are many corrective measures which will minimize the nuisance and contribute to public goodwill. Care must be taken to di cover these available controls and use them.

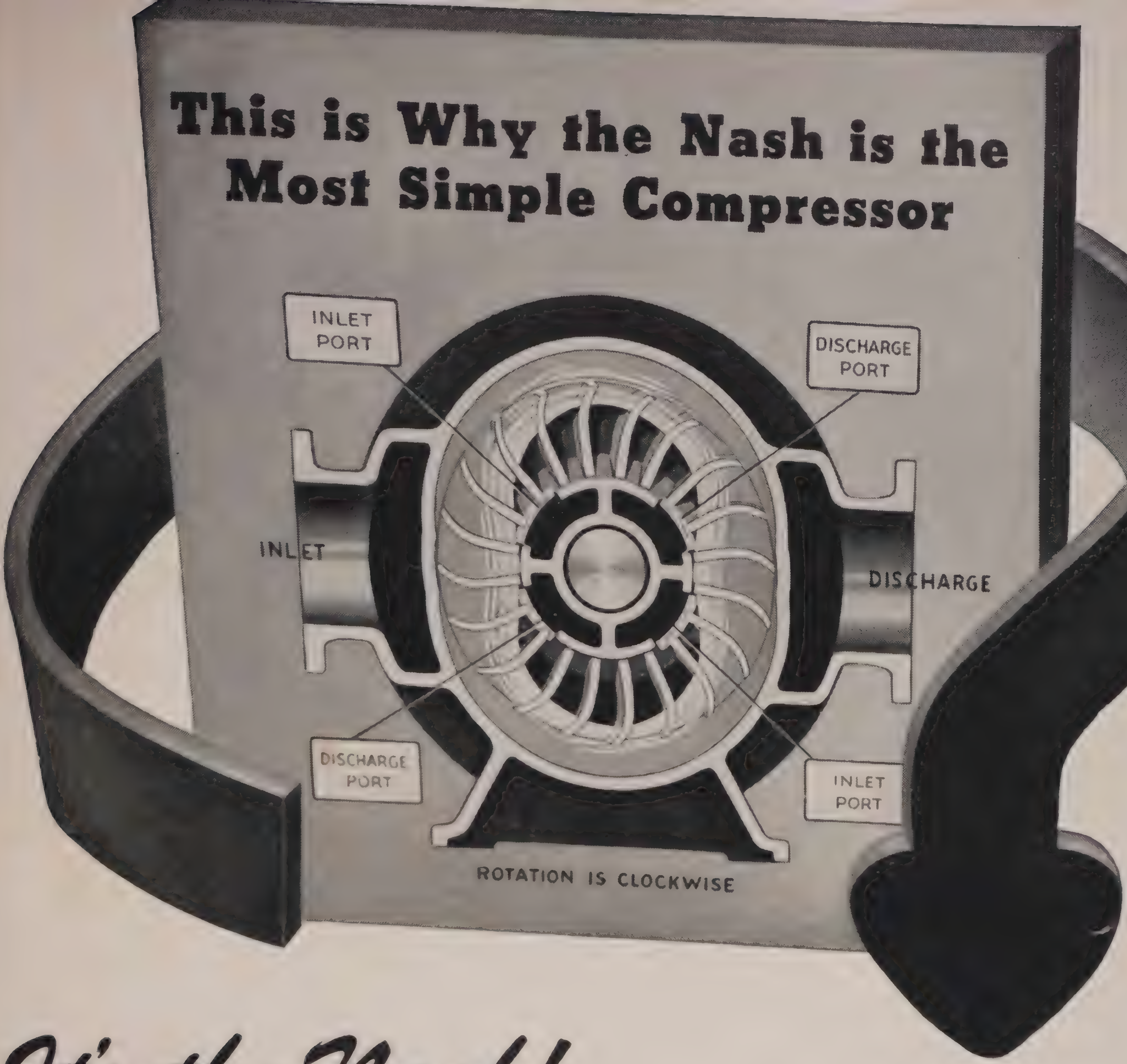
All this is not mere academic preachment. It is all to evident that air pollution is becoming a matter of publ interest with which public officials and residents of nearb areas are actively concerning themselves. In a few case very serious legal attacks have been made. Some of th has not been really justified, as it appears to be inspire merely by recriminative or trouble-making folks. But ther is enough justification in some of the cases to make ver real and very significant the thought that all industry mus look to its air pollution problems with care.

We fear that in some cases nothing but a new site an a new plant will fully meet local needs. We do not expe many major migrations of that sort. But we do expe that there will be pressure for many precautions and con trols which are not now common.

Individual food processing firms will profit, as wi industry as a whole, if corrective measures can be made o a voluntary basis rather than a result of bitter legal contr versies or court action.

Wisely planned and executed on a long-range basis, th cost of neighborliness is not too high.

# This is Why the Nash is the Most Simple Compressor



# *It's the Nash!*

There are no mechanical complications in a Nash Compressor. A single moving element, a round rotor, with shrouded blades, forming a series of buckets, revolves freely in an elliptical casing containing any low viscosity liquid. This liquid, carried with the rotor, follows the elliptical contour of the casing.

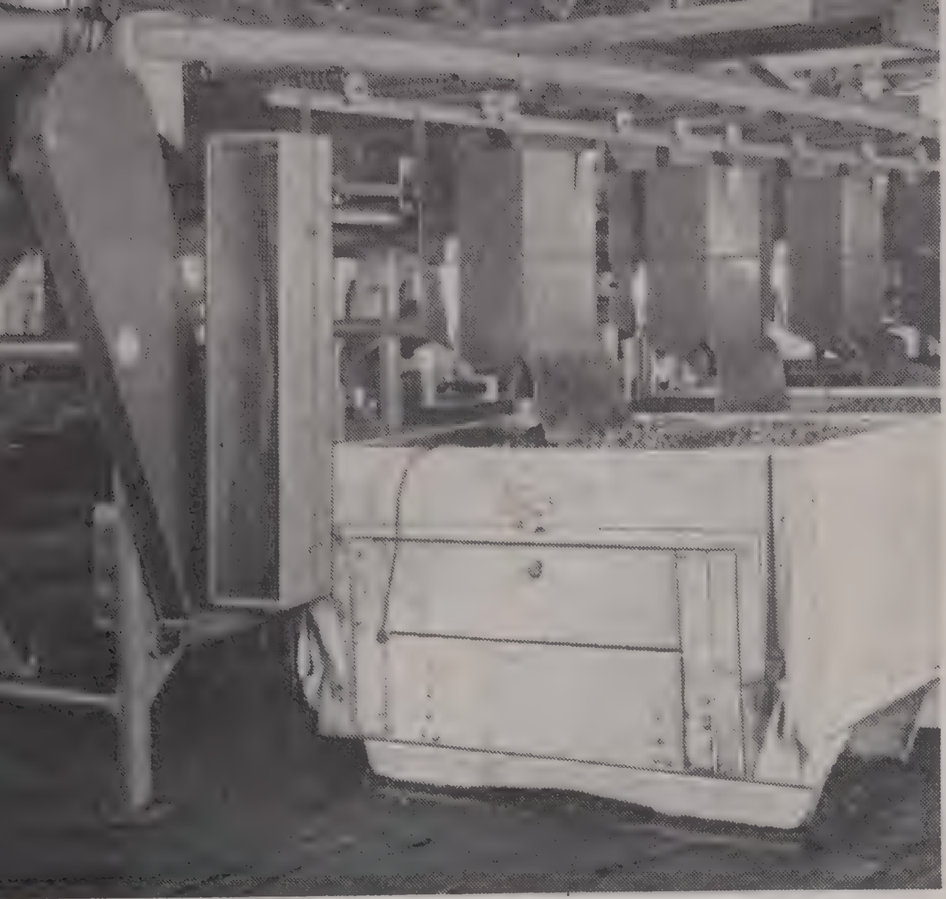
The moving liquid therefore recedes from the rotor buckets at the wide part of the ellipse, permitting the buckets to fill with gas from the stationary Inlet Ports. As the casing narrows, the liquid is forced back into the rotor buckets, compressing the gas, and delivering it through the fixed Outlet Ports.

Nash Compressors produce 75 lbs. pressure in a single stage, with capacities to 6 million cu. ft. per day in a single structure. Since compression is secured by an entirely different principle, gas pumping problems difficult with ordinary pumps are often handled easily in a Nash.

Nash simplicity means low maintenance cost, with original pump performance constant over long periods. Data on these pumps sent immediately on request

- No internal wearing parts.
- No valves, pistons, or vanes.
- No internal lubrication.
- Low maintenance cost.
- Saves floor space.
- Desired delivery temperature automatically maintained.
- Slugs of liquid entering pump will do no harm.
- 75 pounds in a single stage.

**NASH ENGINEERING COMPANY**
**31 WILSON, SO. NORWALK, CONN.**



**1** **SIZE GRADER** is comprised of diverting cables on fixed sheaves—interstices increase from ½ to 1⅛ in.

**2** **PROCESSING TANKS** where olives are darkened and bitter factors removed. Tanks are 6x9x3 ft.

# How Olives Are Processed Today

## Fruit From 2,000 Acres Packed as Ripe and Spanish Olives, and Olive Oil

(Article on Page 59)

LARGEST processor of ripe olives in the world, Lindsay Ripe Olive Co., Lindsay, Calif., also produces pitted and Spanish olives. In an adjacent plant, olive oil is made from over-ripe fruit.

Olives arrive at the plant in lugs holding 35 to 40 lb. At the orchards, these lugs were stacked on pallets previously arranged on flat-bed trucks. At the plant, the load is weighed and the pallets removed by fork-lift trucks.

Lugs are taken from these pallets and placed on a conveyor that moves them inside the plant and automatically dumps the olives onto a deleafer. Empty lugs return to the loading area. Olives roll onto a sorting belt, where clusters are broken up and twigs and leaves removed.

From the sorting table, olives are conveyed to diverging-cable size-graders, where they are separated into 8 sizes—as depicted at Point 1 in accompanying picture-flowsheet. The smallest fruit drop into mobile bins and are transferred to the Spanish olive process. The other sizes drop into padded hoppers and are flumed to tanks, where they are stored in brine.

Olives are pumped from the storage tanks to sorting belts, where over-ripe or damaged fruit are removed, then fall into mobile bins that are emptied into processing tanks. Alternate applications of caustic solution, water, and air, over a period of nine days, are followed by careful washing and immersion in hot brine.

The olives are moved from processing tanks into the pitted-olive department in mobile bins, then size-graded and conveyed into hoppers to feed the pitters. Olives then go to a flotation tank, and those that float (unpitted fruit sink) are removed by an elevator and flumed to the canning department. Whole ripe olives are flumed from processing vats to a size-grader for final separation into uniform sizes.

Whole and pitted olives pass to four sorting tables for final inspection before canning. They then move to hand-pack fillers and are packed into cans—at Point (5) in the flowsheet. Cans are filled with hot water, then tipped to provide headspace, salt is added and lids are seamed on. There are three canning lines.

Sealed cans are placed in a retort and sterilized at 242 F. for 62 min., then cooled by a water spray. They are further cooled (overnight) in a cooling room, then labeled and cased.

Small fruit that are separated in the first size-grader are used in Spanish type olives. They are placed in 1 to 2 percent caustic solution to remove bitter factors, then carefully washed and pumped into 50-gal. barrels. The wash water is replaced with 10 to 15 percent brine, barrel heads go on, and the barrels are rolled into the fermenting yard. When fermentation is complete, barrels are moved into the plant, and the olives are size-graded, inspected, and returned to barrels of original brine for shipment.

Olives that are over-mature or otherwise unsuited for canning are used in the manufacture of olive oil. These olives are washed in warm water, then elevated to a disintegrator, where flesh and pits are ground. This macerated material moves to bull-wheels—at (8) on flowsheet—then is filled into strong, flat bags and charged into the primary hydraulic press, where a pressure of 5 tons per sq. ft. is applied. Bags are then moved to secondary presses, where a pressure of 30 tons per sq. ft. is applied.

Oil and juice from the presses are separated by centrifuging. The oil is then washed, filtered, and stored for two months to permit settling of impurities before packaging.

# **Everything** in piping for food plants ...from the **complete** CRANE line

**For This Evaporator Hookup,** for example, as for any power, process or general service piping installation . . . the broad Crane line meets every need. That's why so many canneries, meat packing plants, sugar and salt refineries rely on Crane for valves, fittings, pipe and accessories. You get the piping you want—when you want it—on one order to your local, well-stocked Crane Branch or Crane Wholesaler.

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RESPONSIBILITY
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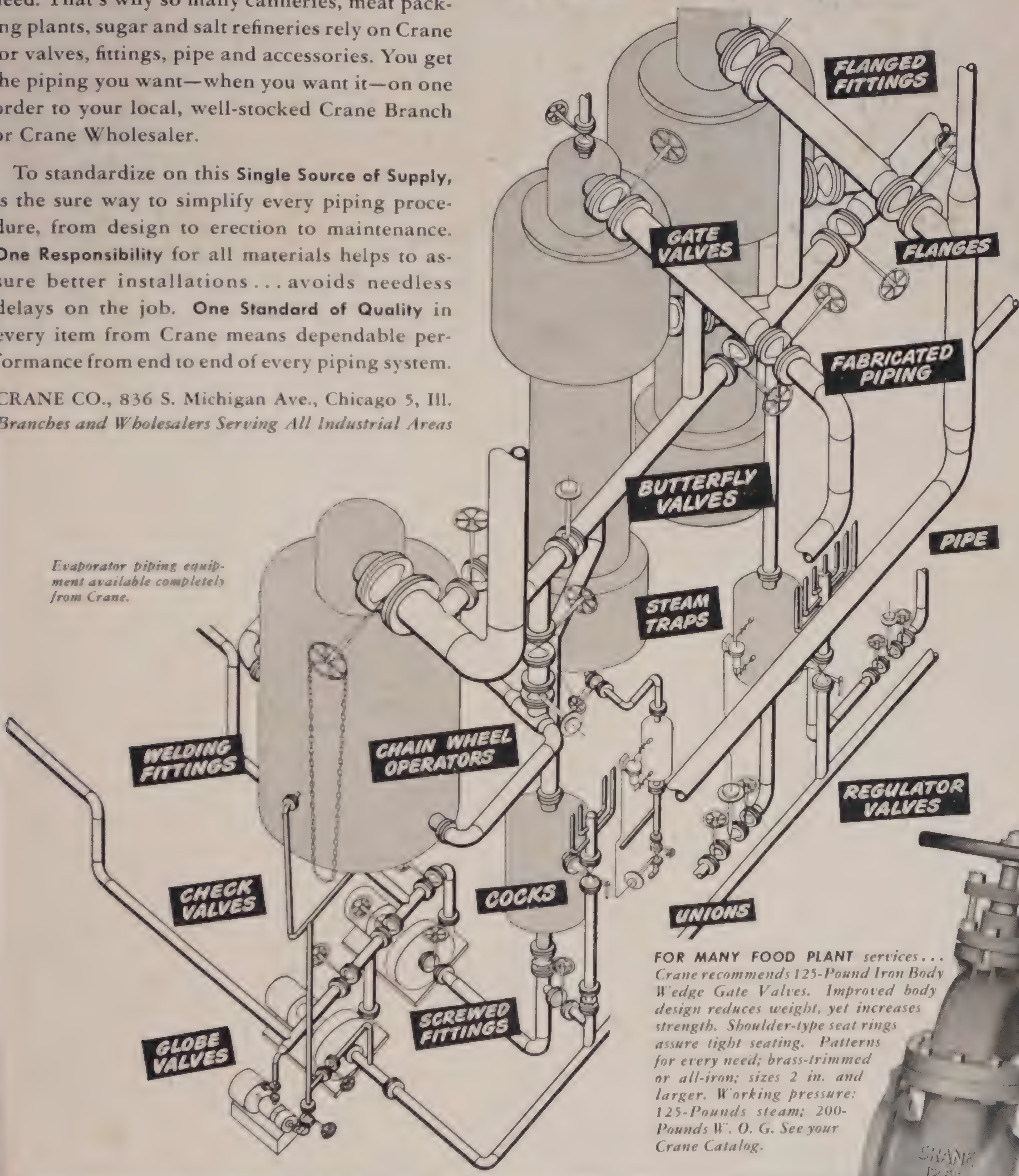
FLANGED FITTINGS
GATE VALVES
FLANGES
FABRICATED PIPING
BUTTERFLY VALVES
PIPE
STEAM TRAPS
WELDING FITTINGS
CHAIN WHEEL OPERATORS
REGULATOR VALVES
CHECK VALVES
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UNIONS
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GLOBE VALVES

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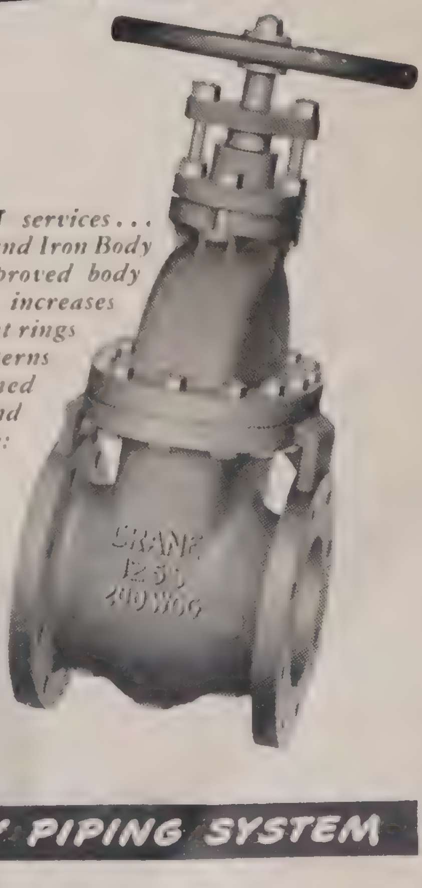
**FOR MANY FOOD PLANT** *services . . . Crane recommends 125-Pound Iron Body Wedge Gate Valves. Improved body design reduces weight, yet increases strength. Shoulder-type seat rings assure tight seating. Patterns for every need; brass-trimmed or all-iron; sizes 2 in. and larger. Working pressure: 125-Pounds steam; 200-Pounds W. O. G. See your Crane Catalog.*


CRANE
125
200 WOG

EVERYTHING FROM . . .

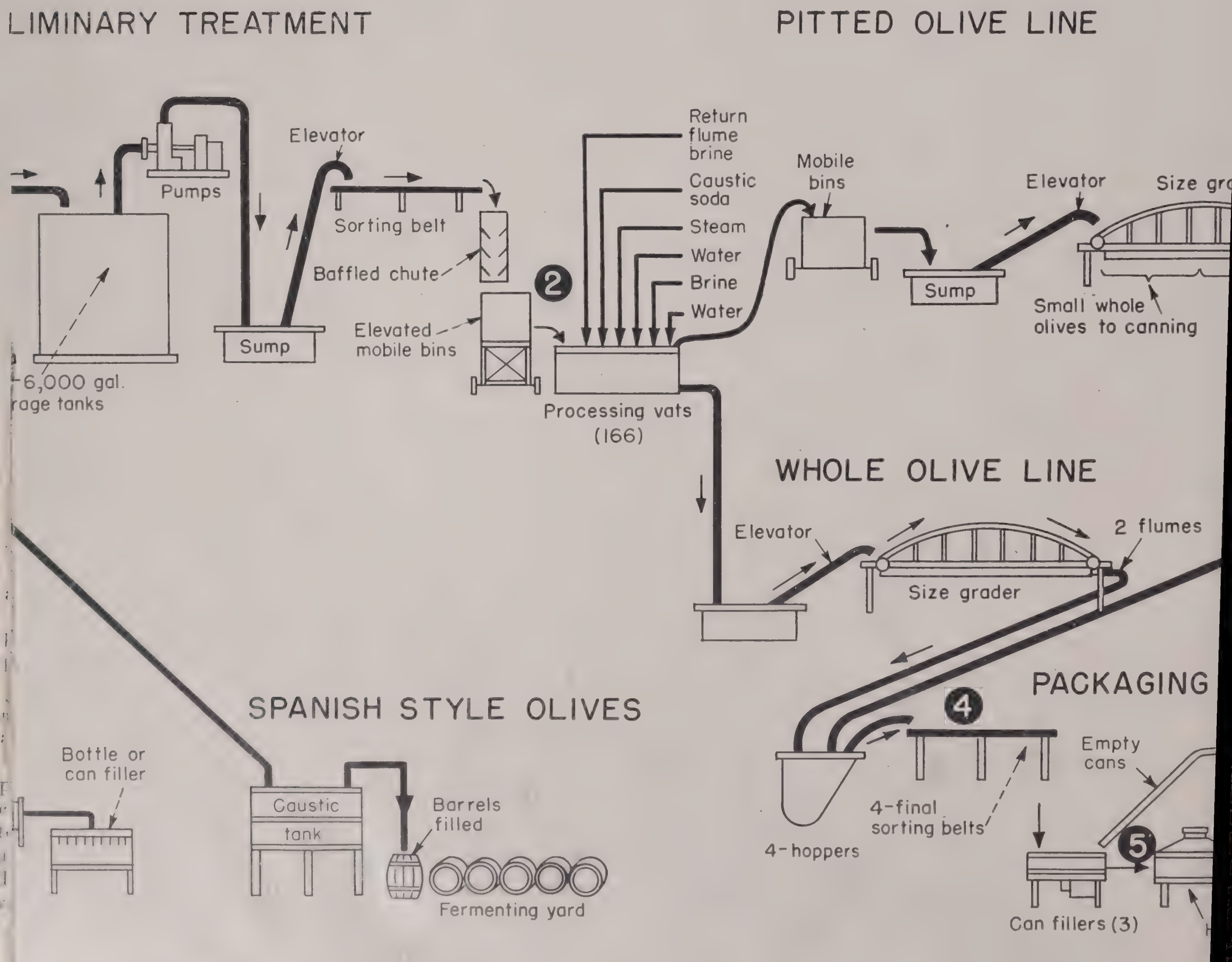
VALVES • FITTINGS
PIPE • PLUMBING
AND HEATING

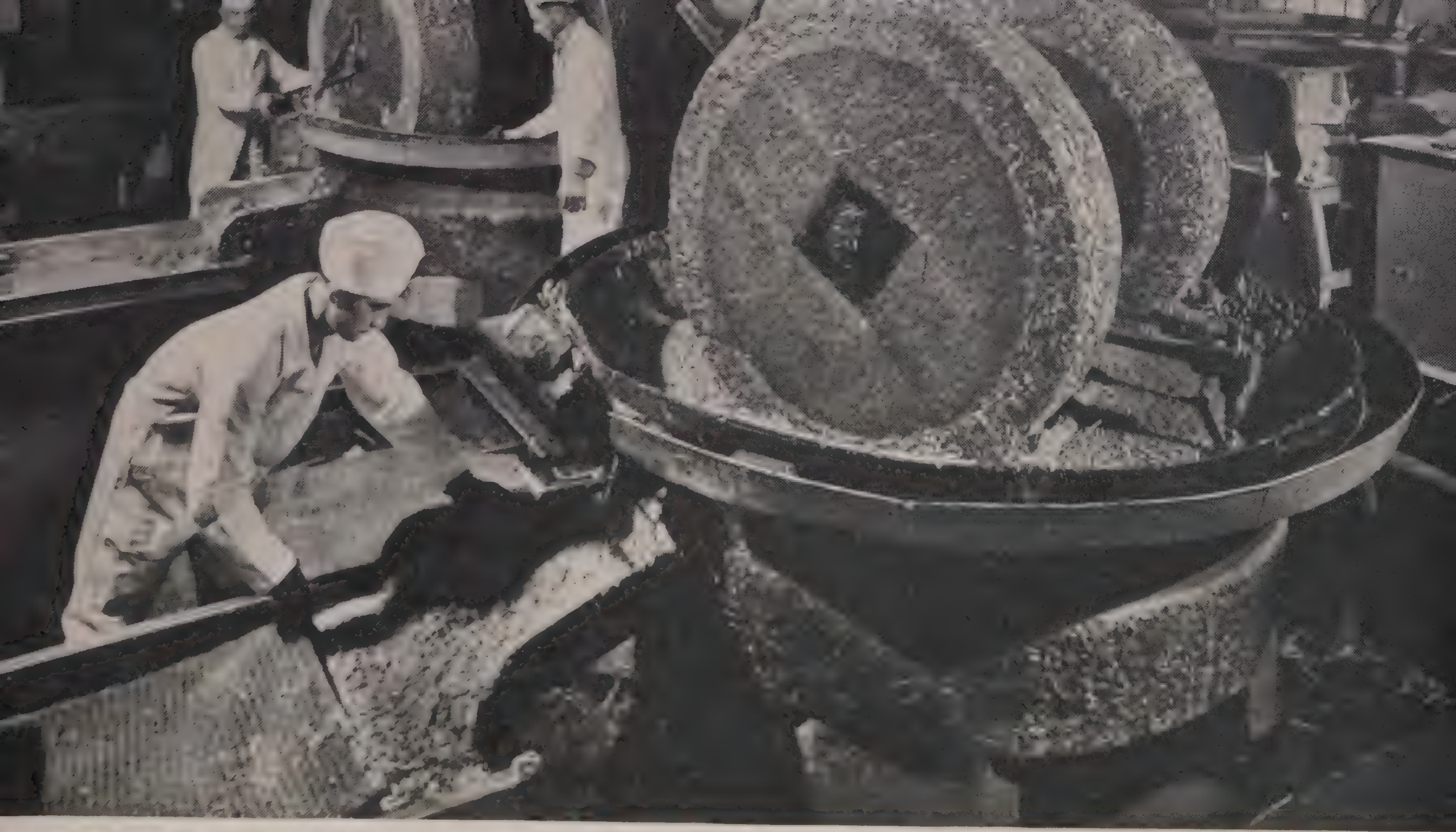
**CRANE**

FOR EVERY PIPING SYSTEM

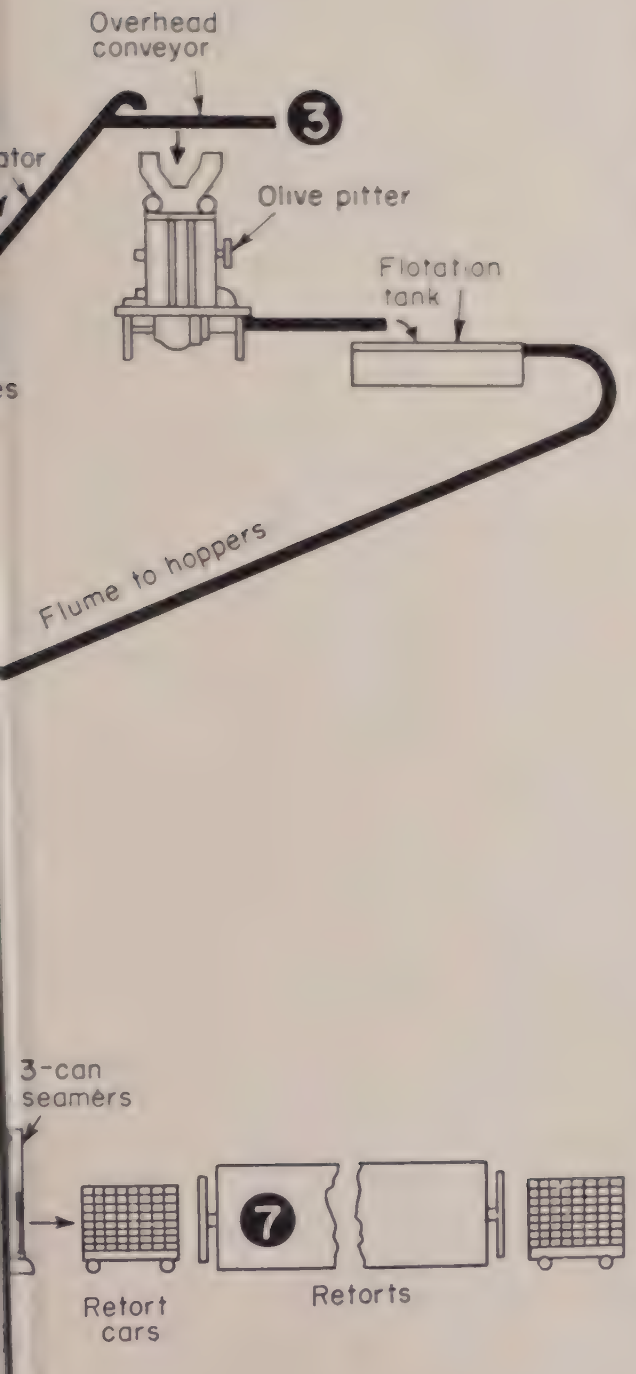
all ripe or green-
ged fruit and culls.

**5, 6, 7** **CANNING.** Sorted olives are conveyed to bowl of hand-pack filler (foreground)
packed. Cans are filled with hot water, salt is added (center), and lids seamed


LIMINARY TREATMENT
PITTED OLIVE LINE
Pumps
Elevator
Sorting belt
Baffled chute
Sump
6,000 gal.
rage tanks
2
Elevated
mobile bins
Return
flume
brine
Caustic
soda
Steam
Water
Brine
Water
Processing vats
(166)
Mobile
bins
Sump
Elevator
Size gr
Small whole
olives to canning
WHOLE OLIVE LINE
Elevator
Size grader
2 flumes
PACKAGING
SPANISH STYLE OLIVES
4
Empty
cans
4-final
sorting belts
4-hoppers
5
Can fillers (3)
Bottle or
can filler
Caustic
tank
Barrels
filled
Fermenting yard



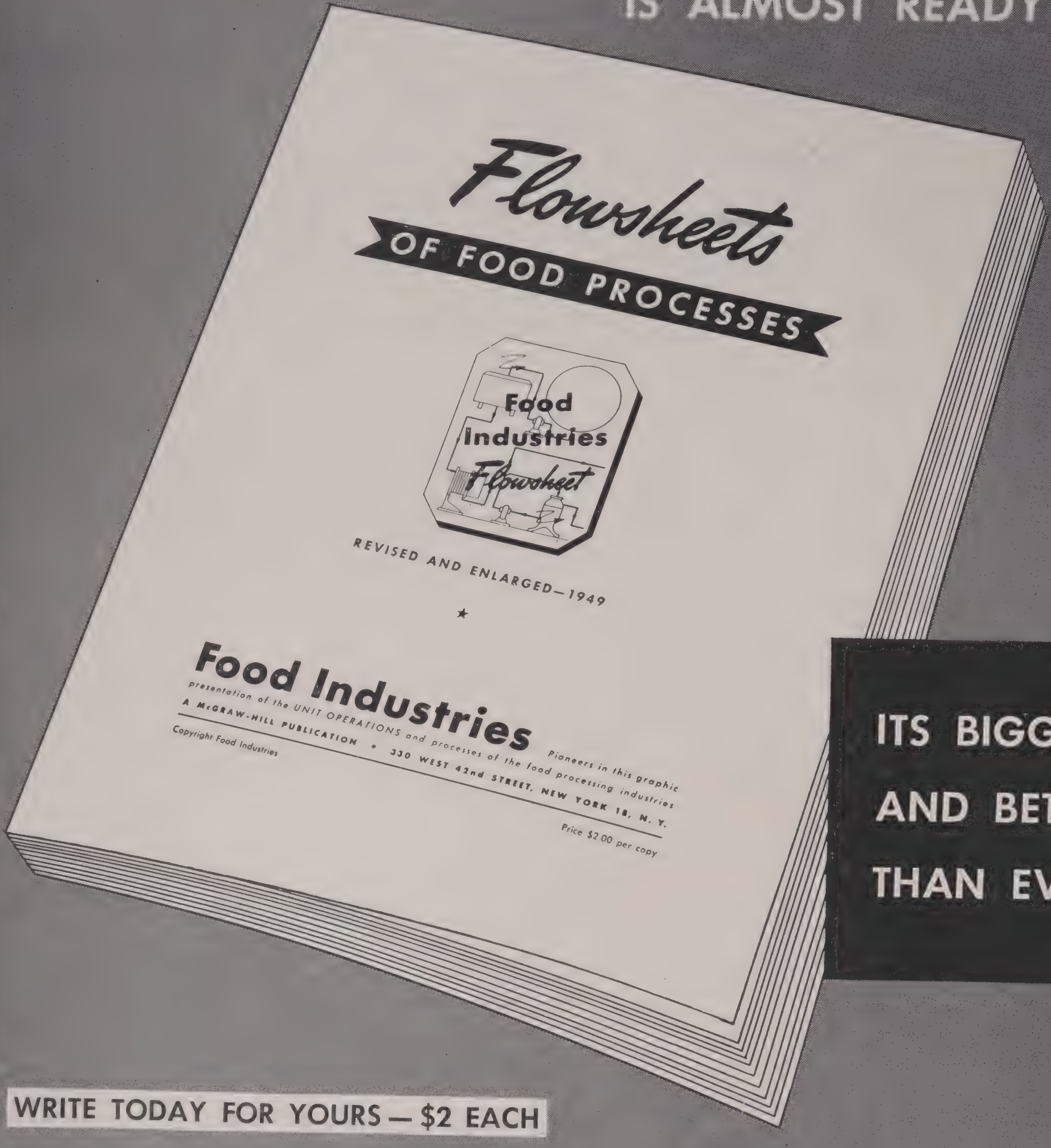
**BULL WHEELS** consist of two round stones, 1¼ tons each. Rolling on flat stone basin, they rupture cells.


Overhead conveyor
3
ator
Olive pitter
Flotation tank
es
Flume to hoppers
3-can seamers
7
Retort cars
Retorts

9 **SECONDARY PRESS** exerts hydraulic pressure (30 tons per sq. ft.) on bags of pulp. This completes extraction.

# THE NEW *Flowsheet Book*

## IS ALMOST READY



*Flowsheets*

OF FOOD PROCESSES

Food Industries *Flowsheet*

REVISED AND ENLARGED—1949

★

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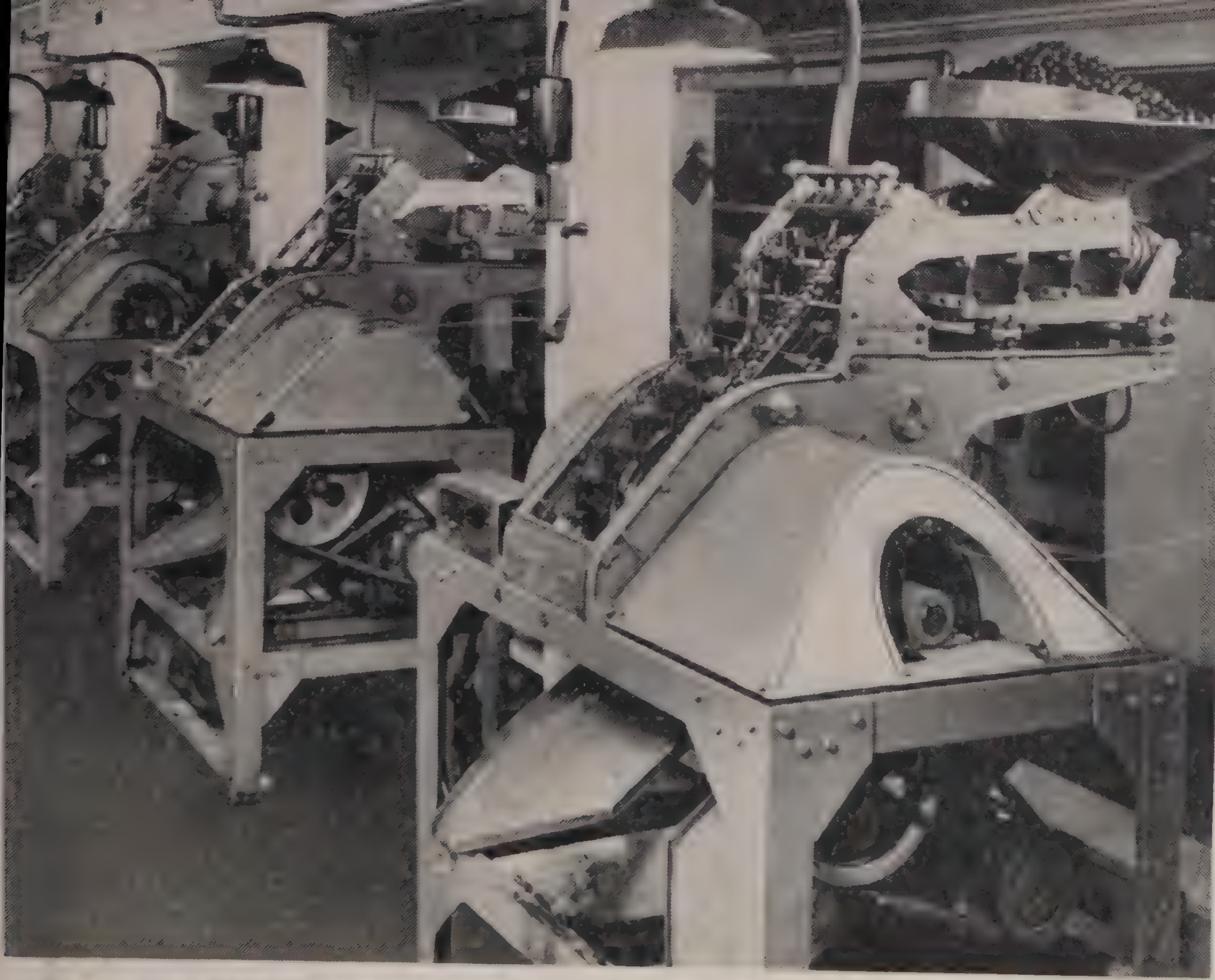
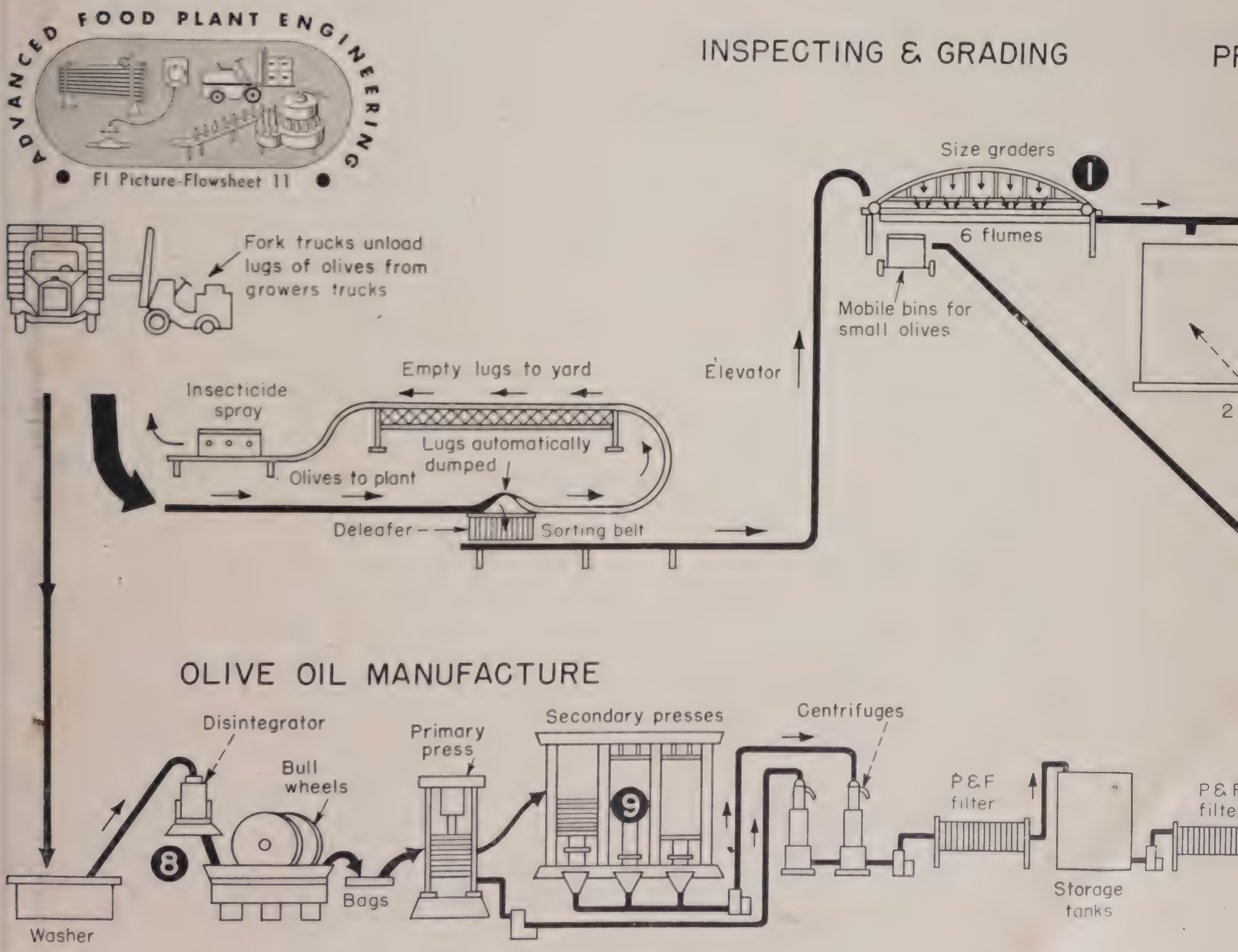


**3** **PITTERS** have capacity of 800 olives per min. Fruit is automatically positioned, a coring tube makes a cut in one end, and punch pin ejects the pit.

**4** **FINAL INSPECTION.** Before ca
ripe olives are sorted to remove


ADVANCED FOOD PLANT ENGINEERING
FI Picture-Flowsheet 11
INSPECTING & GRADING
PR
Size graders
1
6 flumes
Mobile bins for small olives
2
Fork trucks unload lugs of olives from growers trucks
Empty lugs to yard
Insecticide spray
Lugs automatically dumped
Olives to plant
Elevator
Deleafer
Sorting belt
OLIVE OIL MANUFACTURE
Disintegrator
Bull wheels
Primary press
Secondary presses
Centrifuges
8
9
Bags
Washer
P&F filter
Storage tanks
P&F filte

# NOTHING HAPPEN

# to K&M *"Century"*

# Asbestos Corrugate

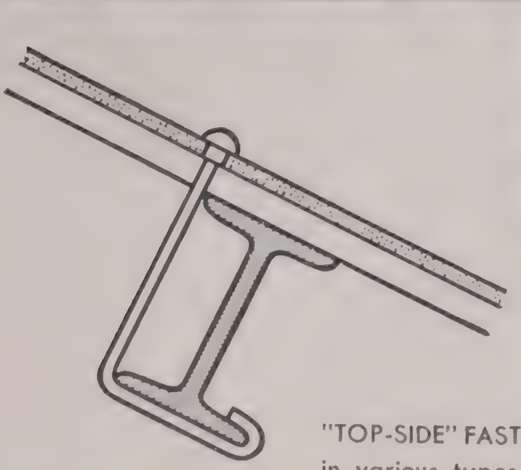
ERECTORS: *Lummus Co., New York City.*

Here you see it used for both
roofing and siding on this Shell
Company building at Deer Pa
Texas. Don't ever expect to see
hurt by the weather or other adve
atmospheric conditions. Count or
to go rustless and rotless. It wo
suffer from rodents and termit
and is exceptionally resistant to fi

Easily cut and fitted on the jo
K&M "Century" Asbestos Corr
gated produces tight, good-looki
surfaces at minimum labor cost. F
extra savings use "TOP-SIDE
fasteners, as on this Shell buildi
They entirely eliminate scaffoldi
and are only available with K&
"Century" Asbestos Corrugated.

Your finished job will benefit
the inherent structural strength
this material which actually gai
strength with age. As for upkee
you needn't figure on even one b
of paint!

*® H. & B. Enterprise Corp.



"TOP-SIDE" FASTENERS are made in various types, to fit all steel members on both roofing and siding. Illustration of typical "J" type for roofing.

*Nature made Asbestos...*
*Keasbey & Mattison has made*
*it serve mankind since 1873*

K&M
best in asbestos

**KEASBEY & MATTISON**
**COMPANY • AMBLER • PENNSYLVANIA**

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AXLES

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Make Trucks Last Longer

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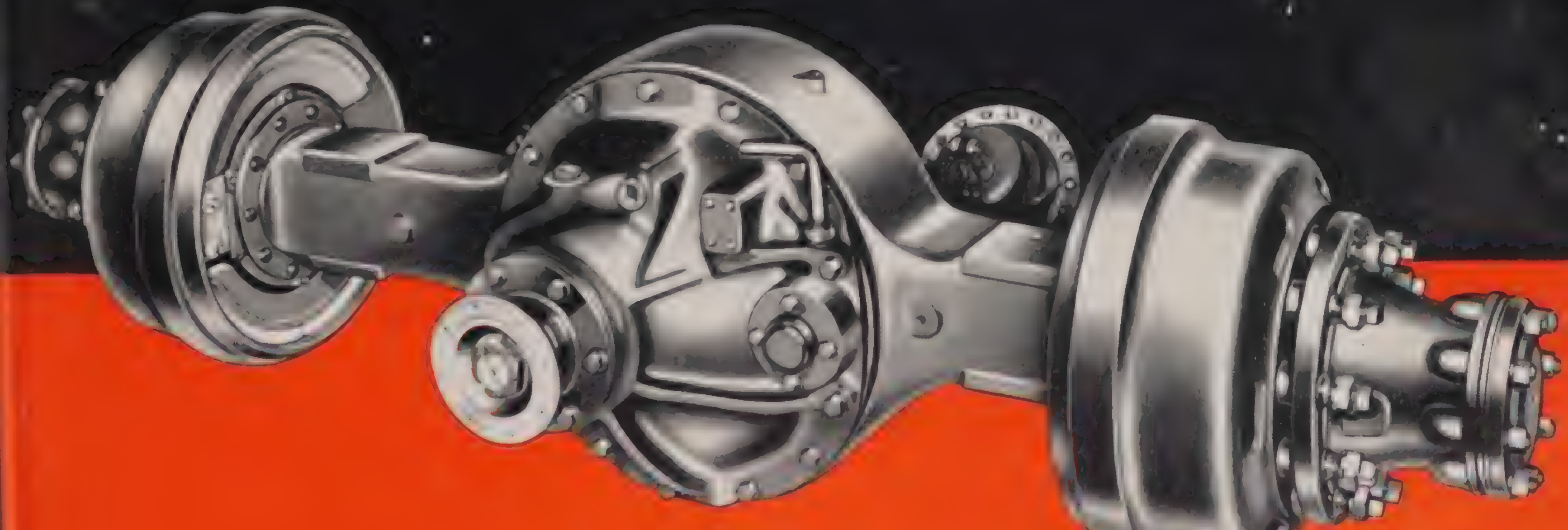
*Eaton 2-Speed Axles*
*in Trucks Today*



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AFRICAN ELEPHANT *

MUTE SWAN **

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Butter - Cream - Cheese
Ice Cream - Milk

**FISH - FRUIT - FROZEN FOODS**
**POULTRY - SHORTENING**
**VEGETABLE**

*No one except maybe another elephant ever accused old *Loxodonta africana* of being beautiful. But his great size and strength make him a symbol of power and protection.

**The mute swan, *Cygnus olor*, is no slouch when it comes to protecting his nest and young, but his chief asset is his well deserved fame for grace and beauty.

*Kalamazoo Vegetable Parchment Company*

PARCHMENT · MICHIGAN

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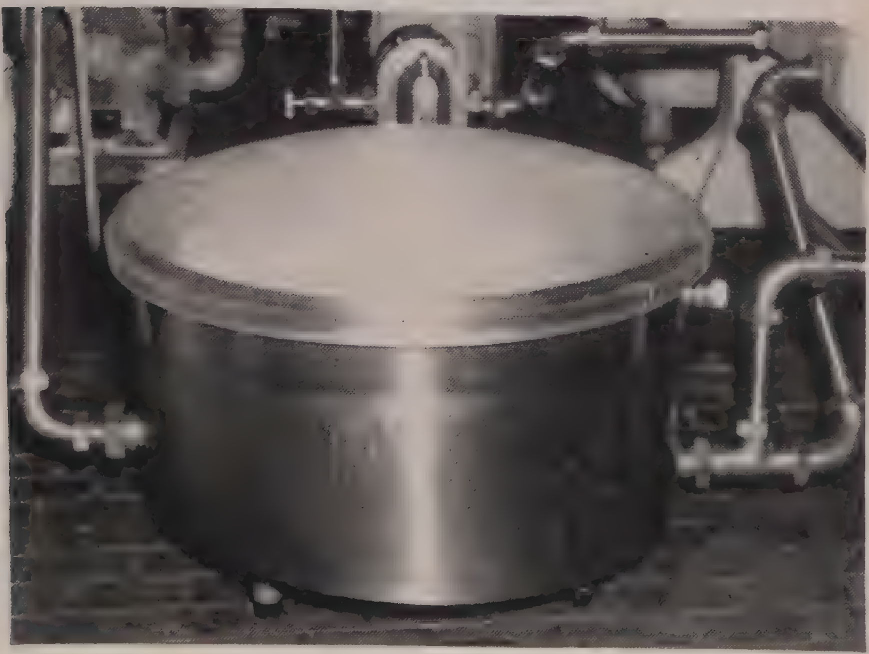
APPLEFORD PAPER PRODUCTS LIMITED, HAMILTON, ONTARIO · MONTREAL, QUEBEC

# PRACTICAL IDEAS



## Plexiglas Solves Psychological Problem

A problem involving worker psychology and having a potential effect on product sanitation has been solved at the fluid milk plant of H. P. Hood & Sons, Charlestown, Mass.

The man operating one of the high-temperature short-time milk pasteurizers was constantly—if unnecessarily—worried about the level of the milk in the pasteurizer balance tank. So he occasionally lifted the cover of this tank to see how much milk it had in it. And sometimes he failed to replace the cover tightly, leaving a small opening that exposed the milk to possible contamination at this particular location.

Recently the stainless steel cover was replaced with one made of Plexiglas. Now the man at the pasteurizer always can see the milk in the tank without disturbing the cover, and both he and the plant technologist are happy.

The original Plexiglas cover was not entirely satisfactory because it developed splits at the periphery. But this difficulty has been overcome by using a cover with a turned-under rim, giving high strength because of its shape.

## Controlling Insects in Elevator Boots

Simple but effective means of minimizing insects in grain-mill elevator boots have come out of mill sanitation studies in Canada. Such control is important because these boots are highly subject to infestation and often are a starting point from which insects spread throughout a mill.

While the obvious answer to the problem is the application of insecticides, there is the complicating factor that many insecticides are too toxic to be used in contact with a food product.

Studies were conducted for six months in three mills under conditions ranging from mild to severe infestation. And best results were obtained with an ethylene dibromide mixture (15 percent in chlorinated solvents), with straight ethylene dibromide and dichloroethyl ether. Since these evaporate slowly, they tend to be retained (as has been indicated by sampling of dead grain stock from bottom of boot), and they continue to be effective for an appreciable time after application.

The mixture of ethylene dibromide was applied once a month through the boot hand-hold, or down the sides of the boot. Dosage was 12 oz. per boot. The ethylene dibromide was put on a blotter on the floor of the boot, the dosage being 2 oz. per boot, applied monthly. Dichloroethyl ether was applied in the same manner, quantity and frequency as ethylene dibromide.—*From a paper by B. N. Smallman and F. L. Watters, presented at Association of Operative Millers Convention, Toronto, May, 1949.*

### $25 EXTRA FOR BEST ITEM

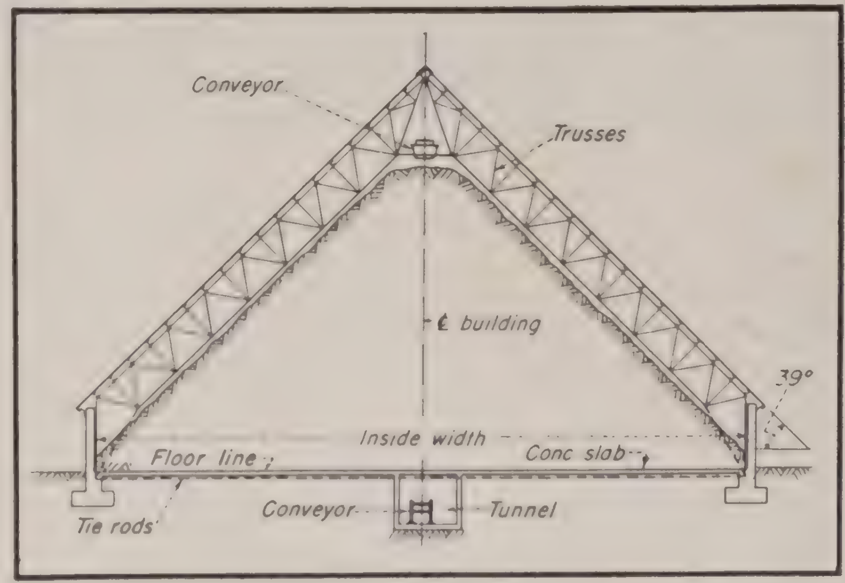
**You are invited to submit items for this "Practical Ideas" department. You will be paid at regular rates when your item is published, and if it is judged the best for the month, you will receive additional pay of $25.**

**Selection of the best item will be made by a group of 200 readers each month, and the name of the author and item title will be cited in these pages in a subsequent issue.**

**"Practical Idea" items may describe any type of device or method recently developed to solve a problem, speed an operation, or make some task easier. The item may concern factory, laboratory, warehouse, or power-plant operations in the food industry. "Practical Ideas" pertaining to management, maintenance, and trucking or shipping also are suitable.**

**You need not be an experienced writer or draftsman to submit "Practical Idea" items. The text will be edited and sketches converted to finished drawings.**

**Send your items to: "Practical Ideas" Editor, FOOD INDUSTRIES, 330 W. 42 St., New York 18, N. Y.**



## Bulk-Material Slope Sets Warehouse Shape

To provide the Montreal refinery of Canada & Dominion Sugar Co., Ltd., with adequate stocks to maintain normal winter operations, a storage warehouse involving a new practical principle in roof design is being built.

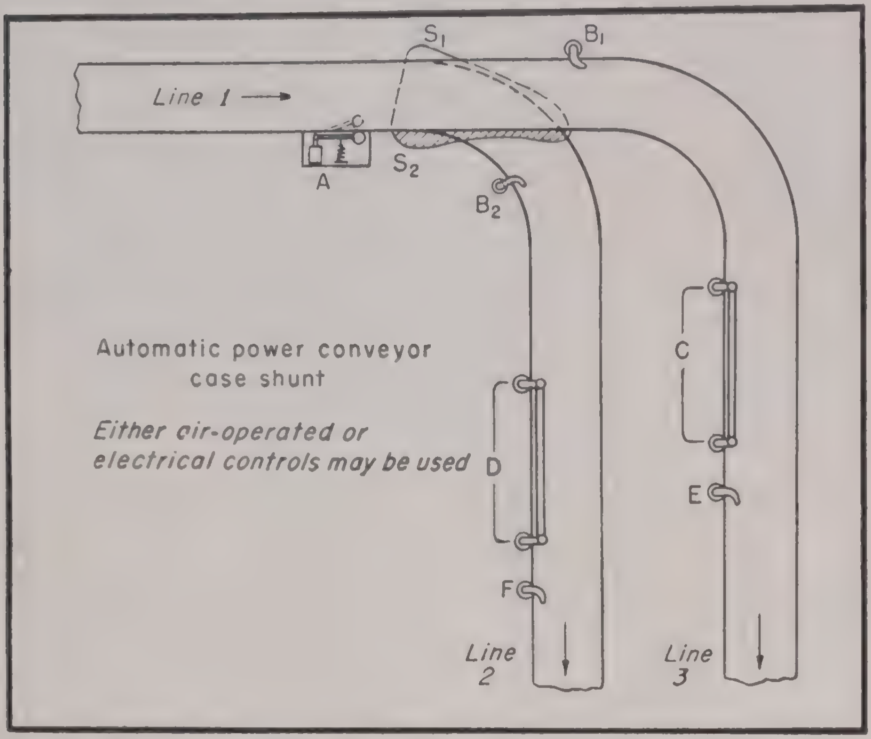
Prismoidal in shape, the warehouse is 500 ft. long by 120 ft. wide, and has a capacity of 40,000 long tons of raw sugar in bulk. The 39-deg. slope of the roof (see drawing) is based upon the angle of repose of bulk raw sugar.

Received over ship's side in the customary way, sugar, will pass to a cut-in conveyor, and weights will be recorded.

After dumping the bags, sugar in loose form will be distributed over the full length of the warehouse by means of an endless overhead belt conveyor. Upon discharge from the belt, sugar will seek its natural slope, since the shape of the building permits this.

With outside temperatures falling to −20 deg. F., raw sugar stored in bags solidifies like concrete blocks. Handling frozen bags from high piles out of storage creates a grave hazard for the warehouse staff. This danger is completely eliminated by the new handling method.

For moving the sugar to reclamation, there will be used a discharge conveyor installed in a tunnel beneath the floor and running the full length of the warehouse. Through openings in the floor, at convenient places, a rubber-tired bulldozer, operated on the warehouse floor, will feed sugar to this conveyor. From the tunnel, sugar will subsequently be elevated to an over-head belt, which will deliver it to the mingler of the washhouse.—*Harry Chapin Plummer, 2157 Gauthier St., Montreal 1, P. Q.*


S1
B1
Line 1 →
A
S2
B2
C
D
E
F
Line 2
Line 3
Automatic power conveyor case shunt
Either air-operated or electrical controls may be used

## Two Conveyors Fed From One

From a single conveyor, cases are supplied in the desired quantities to two separate lines by an automatic shunt.

Referring to the sketch, when the shunt is in position $S_2$ and the case stop, A, is open, cases will travel down Line 1 and into Line 3 until the first case touches control arm C. This arm actuates case stop A, halting the flow of cases on Line 1. Cases on Line 3 continue until the first case contacts the shunt control E, which actuates the shunt arm and shifts it to position $S_1$, and at the same time automatically releases stop A to allow cases to proceed down Line 2.

If a case is blocking shunt control F on Line 2, the shunt bar will not shift. Cases will then continue into Line 3 until the last case on Line 2 clears shunt control F, allowing the shunt to shift to $S_1$. Cases will then proceed down Line 2. Control arm D and shunt control arm F serve the same purpose as their counterparts on Line 3.

Control points $B_1$ and $B_2$ prevent the shunt arm from operating if cases are in the shunt-arm travel area.

Control arms C and D are designed so that the last case will clear the area in which the shunt arm travels just before the first case strikes the shunt controls E or F.

In our particular application, five cases are permitted to pass onto Lines 2 and 3 at a time. Lines 2 and 3 travel faster than Line 1. This enables the cases to catch up and provide a continuous supply where needed.

Since the conveyor shunt operates in an area where water is present, air controls are used. In a dry area, electrical controls can be installed.

This device eliminates the need for duplicate sources of supply. It has been in operation for a period of over six months without a failure.—*T. J. Kullman, Production Manager, Bowman Dairy Co., Chicago.*

## Battery Records Reduce Power-Truck Costs

Systematic application of simple maintenance practices will extend the life of electric storage batteries used in industrial trucks, reducing overall costs of such equipment by 5 to 10 percent for each year added to battery life.

The principal causes of early battery failure are improper charging and failure to repair damaged cells.

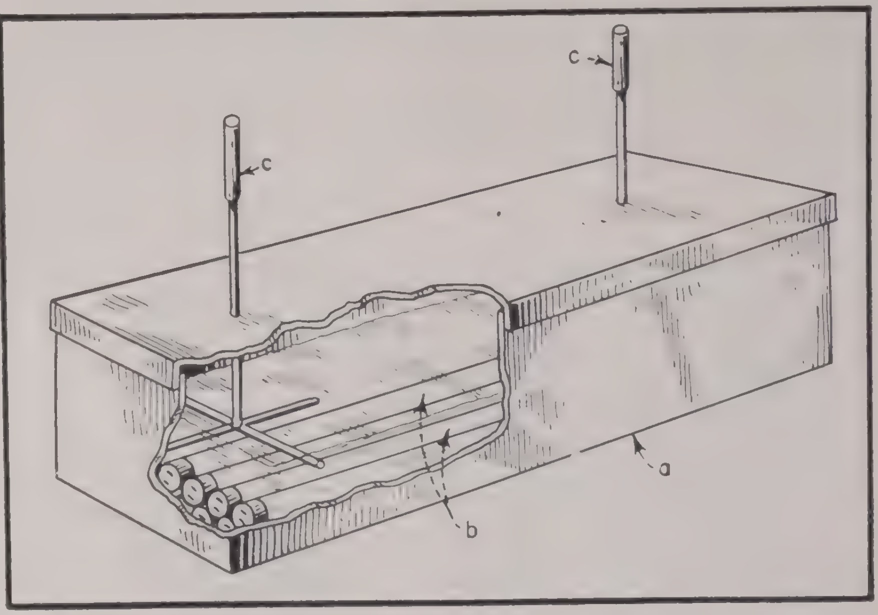
One of the best systems for controlling battery maintenance is a daily record system. Batteries are designated by numbers, and as a battery is installed in a truck, the following data are recorded: Specific gravity, temperature, time battery is put into service, and truck to which it is assigned.

Each time a battery is returned to its charging station, the following facts are entered on the control sheet: Specific gravity, temperature, time, and setting of ampere-hour meter, together with a note as to whether evaporated water was replaced.

The control records will quickly inform the supervisor whether the battery receives sufficient charge before going into service, length of time it was in use, whether it was discharged below normal value, whether batteries are being charged properly, and whether cells are defective.

This information enables the supervisor to establish a procedure for charging the batteries which will avoid their being overworked, thereby increasing truck efficiency and preventing lost-time due to failure during the duty period. It also tips him off as to when cells should be repaired or replaced to avoid damage to the good cells, thereby extending the battery life.

For best service, the battery manufacturer's maintenance recommendations should be carefully followed.—*From "Gould Battery News", Gould Storage Battery Corp., Trenton, N. J.*



## Break Fluorescents Safely—Under Water

To discard fluorescent light tubes on the trash pile is hazardous. Powder used in some of the tubes contains a small amount of beryllium compound. How harmful this chemical may be to some individuals is still a question.

To break up the tubes in a safe way, do it under water. For this purpose a device is shown in the sketch.

Box, a, made of wood or metal, holds enough water to cover fluorescent tubes, b, placed therein. Crushers, c, are used to break the tubes. The operator simply lifts crusher and rams it back down on the tubes to break them. The water takes care of the beryllium dust.

If the operator is not protected from the powder and glass by this or another method, he should by all means wear goggles, respirator and heavy gloves.—*General Electric Co., Schenectady, N. Y.*

# Be Doubly Sure! Where corrosion conditions are severe or product contamination must be avoided . . .

## Specify JENKINS stainless steel VALVES

In plants handling corrosive liquids, or fluids that must be kept free from contamination or discoloration, Stainless Steel Valves must be not only the right *type*, but fabricated of the *proper* alloy for the service.

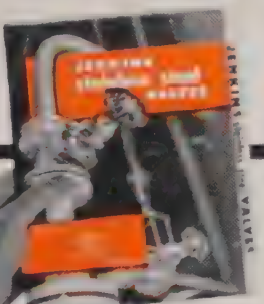
To keep production at peak, and down-time for repairs and replacements to a minimum, alert management chooses Jenkins Stainless Steel Valves. Built to the same quality standard which has made "Jenkins" the preferred industrial valve, Jenkins Stainless Steel Valves are available in a range of sizes to meet almost any service requirement.

Equally important, however, is Jenkins Engineering Service. Providing information you need to select the alloy or type of valve which will render the best service (based on analysis of specific information about the valve installation), Jenkins engineers can be of valuable assistance.

Send the coupon today for the new folder describing the complete line of Jenkins Stainless Steel Valves. It includes specifications and helpful data on selection.

Jenkins Bros., 80 White St., New York 13; Bridgeport, Conn.; Atlanta; Boston; Philadelphia; Chicago; San Francisco. Jenkins Bros., Ltd., Montreal.

***Sold through leading Industrial Distributors***



**JENKINS BROS.**
80 White Street, New York 13, N. Y.
***Please send Stainless Steel Valve Folder — Form 194.***

NAME______________________________

COMPANY___________________________

ADDRESS___________________________

___________________________________

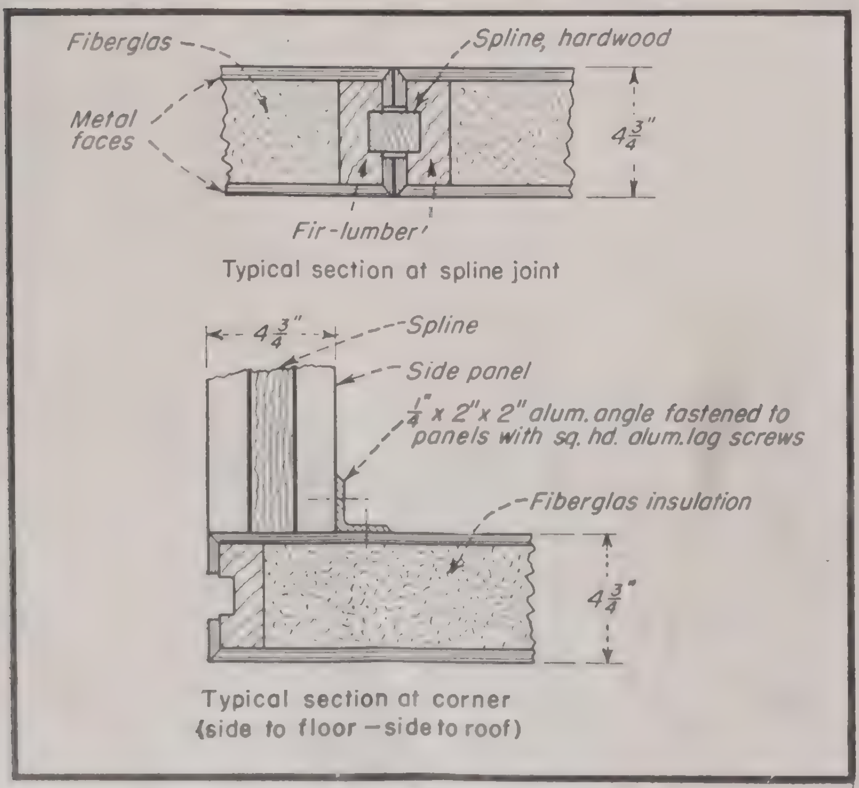
JENKINS
LOOK FOR THE DIAMOND MARK
VALVES
SINCE 1864
TRADE JENKINS MARK

**HERE** is a five-unit walk-in cooler constructed of stainless steel-faced plywood panel sections.

## Erection of Walk-In Cooler Is Fast and Simple

To meet economy and sanitary requirements of the food industry, a new type walk-in cooler has been developed for large commercial and industrial users. It is made of Armorply, which comprises thin strips of metal adhesively bonded to plywood.

The cooler has been designed for erection by the u
in sections, to provide any amount of refrigeration spa
Applying the architectural principle of module, fixed si
of prefabricated panels are assembled at the cooler locati
Features of the new unit are: (1) Light weight, e


Fiberglas
Spline, hardwood
Metal faces
4¾"
Fir-lumber
Typical section at spline joint
4¾"
Spline
Side panel
¼" x 2" x 2" alum. angle fastened to panels with sq. hd. alum. lag screws
Fiberglas insulation
4¾"
Typical section at corner (side to floor — side to roof)

**Details which assure . . .**

**. . . ease of erection**

of cleaning, and efficient use of floor space, (2) design simplicity making assembly easy and erection fast, (3) can be readily knocked down and moved to another location, enlarged or reduced in size, (4) metal faces prevent moisture vapor transfer through walls, (5) thickness of insulation (4 in.) in panel cavity contributes to low heat transfer and economical operation with any conventional electrically operated refrigeration unit.

These panels have been tested over the past two years and are now in practical operation in the Kraft Foods Co. research laboratory at Glenview, Ill.

Metal faces on the panels, states the manufacturer, effectively eliminate, within practical limits, the main factor causing insulation to "ice up" and lose efficiency. Subjected to temperature differential of 70 deg. F. for four weeks, the test panels showed no icing of insulation, even though abnormally high relative humidity was maintained on both face and back of panels during the test.

It requires only five types of modular units to construct coolers in a wide variety of sizes and shapes. Basic modules can be had with faces of stainless steel, aluminum, or electrolytically zinc-coated steel, the latter affording exceptionally good paint adherence. Use of very thin gages of metal laminated to plywood permit economy in cost. Fiberglas insulation is used.

Standard modular panels are available for coolers 8 ft. high, 8, 10, or 12 ft. wide, and, within 2-ft. multiples, any length desired. Door assembly and adjacent jamb panels have a 6 ft. combined span permitting their location in place of any three adjacent standard wall panels. Thus, the door can be placed at almost any location in the cooler. More than one door may be installed if desired.—*United States Plywood Corp., 55 W. 44th St., New York City 18.*

## Inspection Lamp Handles All Bottles

Adaptable to all bottles, colored or white, a new type inspection light, named the "Sunrise," consists of a fabricated, sheet-metal box, electrically welded, 30 in. long by 12 in. deep. On the top is mounted a vent in which an air circulating fan is installed.

The unit is powered by G. E. globes specially treated, and the fixtures are made as waterproof as possible, also heat resistant.

In operation, this light produces rays that penetrate into the different bottles being inspected. The principle is similar to that of filters on cameras.

There is an adjustment on the lamp mountings so they can be moved forward or backward to produce the exact quantity of rays necessary for the particular bottle to be inspected. The light comes equipped with an adjustable stool that can be raised or lowered to the height of the existing standard bottling line.—*Keenline Equipment Corp., Oshkosh, Wis.*

## Turning Radii Reduced on New Truck Models

Increased maneuverability and faster handling of materials in confined storage areas are possible with the special short-turn models of the Clipper, Carloader and Utilitruc electric battery-powered trucks.

The new models are of 2,000-, 4,000- and 7,000-lb. capacity, respectively. Standard models will remain unchanged.

Redesign of the trucks' battery compartments and counterweights to provide angled corners has reduced the turning radii by 6½ in. on the 2,000-lb. truck, 6¼ in. on the 4,000-lb., and 6 in. on the 7,000-lb.

Tested by extensive use in congested warehouses, these new models have demonstrated a high degree of fast maneuverability in narrow aisles and in loading and unloading carriers. Machines are available for export sale. —*Clark Equip. Co., Industrial Truck Div., Battle Creek, Mich.*

*(Food Equipment Continued)*

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## DON'T MISS THESE . . .

**Can washer-dryer** handles cylindrical cans at the rate of 300 per min . . . . . . . . . . . . . . . . . . . . . . . . Page 112

**Unit seals** varied cases without adjustment. It is semi-automatic . . . . . . . . . . . . . . . . . . . . . . . . Page 112

**Plug valves** are automatically lubricated by a new energizable compound . . . . . . . . . . . . . . . . . . Page 112

**Water purity indicator** gives rapid check of distilled and de-ionized water . . . . . . . . . . . . . . . . . . . . Page 116

## AND WATCH FOR . . .

**Retort loader-unloader** takes cans directly to and from cooker . . . . . . . . . . . . . . . . . . . . In December FI

**Hand refractometer** gives quick analysis on fruits and vegetables . . . . . . . . . . . . . . . . . . In December FI

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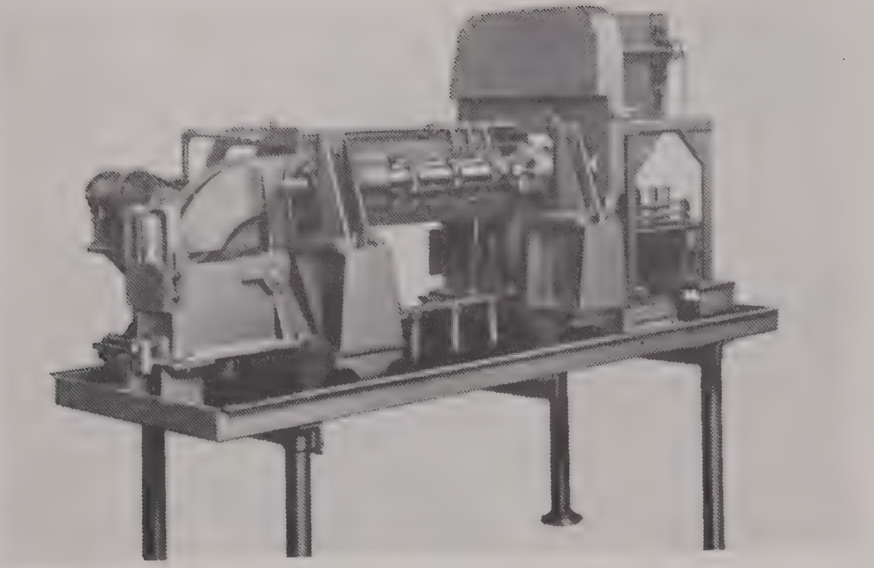

## Can Washer-Dryer Speeds Production

Various sizes of cylindrical cans are washed, dried, or both, at the rate of 300 per min. by a recently developed machine.

Known as "Rex Roto-Brush," it is a compact unit occupying a space 3 x 7 ft. It consists of a preliminary conveyor, main conveyor, rubber roll, brush, fractional hp. motor and a larger motor. This machine eliminates long air drying conveyor lines by doing the same work in less space and time. No operator is required for normal runs.

A preliminary conveyor of two strands of roller chain picks up the cans from the feeding conveyor and carries them through a spacing worm. Here, the cans enter between the flights of the main conveyor, which carries them up and places them horizontally on a hardened stainless steel bar between the rubber roll and the brush.

The cans travel in the depression between the roll and the brush. The roll holds the can against the brush while rotating the can. When the machine is used to wash cans, before the cooking process, both can and brush are simultaneously sprayed.

During the spraying, part of the brush scrubs the can and, as the can moves on, the rest of the brush remove most of the water from the can. It leaves the machine only slightly damp but clean. An adjustable stripper blade removes surplus water from the brush to the catch pan at the bottom of the machine.

If the machine is to be used as a cleaner and dryer only, the spray nozzles are not used, since there is already sufficient moisture on the cans from the cooker or cooler. Here, the cans leave the machine completely dry. The brush performs the drying function but all else remains the same.

When the can reaches the end of the brush, it is automatically returned to an upright position and placed on the next conveyor, ready for the following step in the process.—*Chain Belt Co., 1600 W. Bruce St., Milwaukee 4.*

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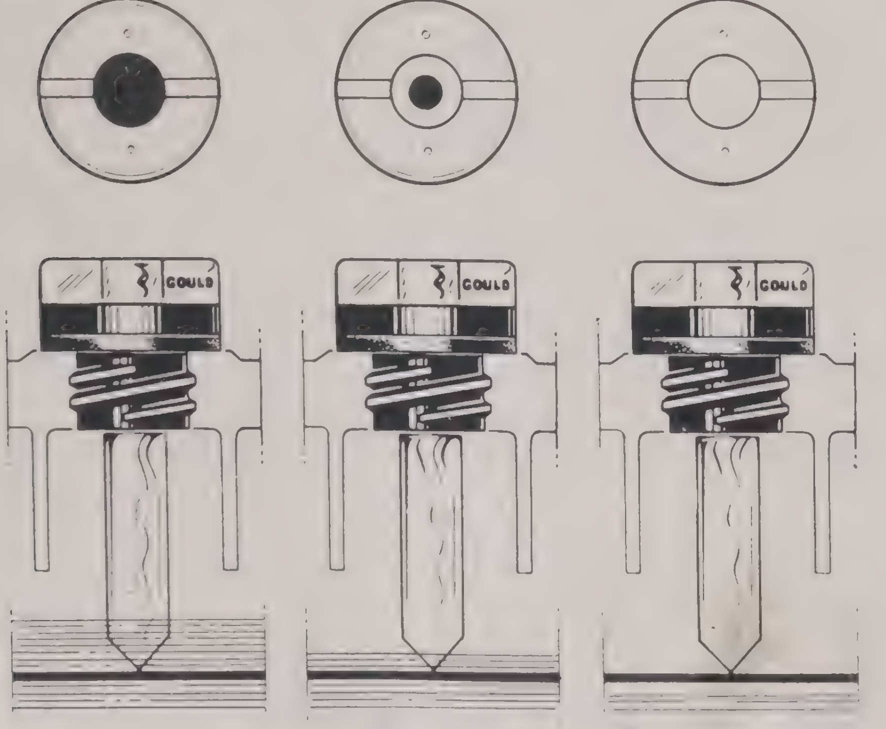
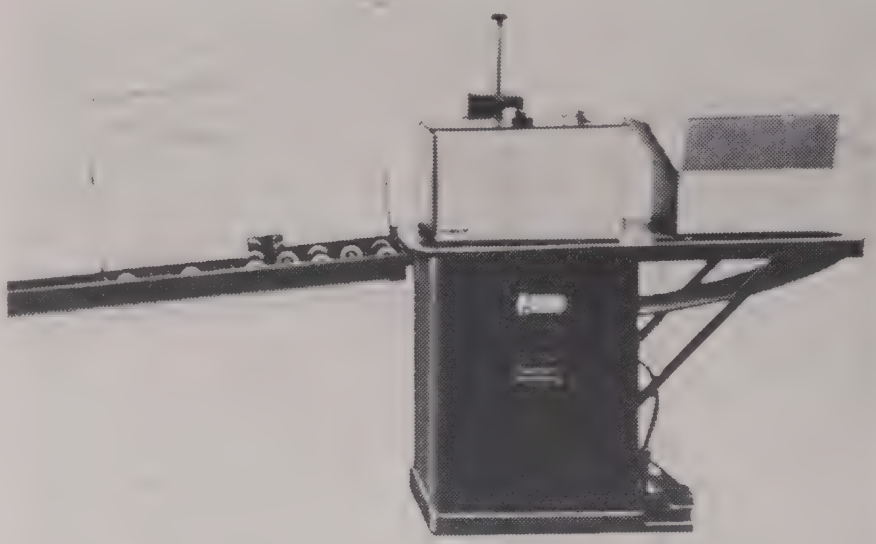


## Plastic Plug Reveals Battery-Water Level

At-a-glance indication of whether a battery needs water is the function of a new translucent vent-plug, "Televel". Thus, maintenance men can determine electrolyte levels without unscrewing the plug, saving time and eliminating a monotonous chore.—*Gould Storage Battery Corp., Trenton, N. J.*



## Unit Seals Varied Cases Without Adjustment

Cases of different widths, heights, and lengths, are handled one right after the other by a new semi-automatic sealer. It is not necessary to adjust the apparatus for the different sizes.

Known as the "Sealall", this unit eliminates the necessity of storage conveyors or the down-time required to change from one size case to another. Speed is from 1 to 5 cases per min.—*A-B-C Packaging Machine Corp., 220 Hampshire St., Quincy, Ill.*

## Plug Valves Are Automatically Lubricated

Use of a new energizable lubricant now makes possible a method of providing automatic lubrication of pressurized plug valves on lines carrying oil, water, gas, chemicals and slurries.

Known as "Hypermatic," this lubricant seemingly establishes a new principle in fluid dynamics. For the first time in the history of lubricant development, states the maker, a compound has been created which is both compressible and expandable and which embodies dynamic properties wherein energy may be stored for prolonged periods to give automatic action in its feeding.

Thus, if a lubricated plug valve of the company-type should ever "spring" a leak, the automatic force-feed action of the new lubricant instantly seals the void. If the valve has gone unchecked, it keeps itself in a state of 100 percent lubricated condition and remains energized. Pressure does not quickly decline but may remain for months.

The maker states that man-hours spent in the maintenance of pressurized plug valves will be drastically cut because the lubricant can materially reduce the frequency of re-lubrications of plug valves. This maintenance of such valves in fully lubricated condition increases their life.—*Nordstrom Valve Div., Rockwell Mfg. Co., Pittsburgh 8.*

*(Food Equipment Continued)*

EVER SEE GREASE
Crawling?

**Patapar can stop it...** What causes the grease stains that sometimes appear on the outside of food packages? It's caused by grease penetrating the wrapper. Or it's the result of grease "crawling." Grease has a peculiar way of doing this. It crawls around the edges of the inner wrapper and works its way to the outer surface of the package. Messy stains result.

But grease "crawling" now can be halted. By using a special type of grease-resisting Patapar Vegetable Parchment, all grease is kept *inside* the wrapper. This Patapar innovation has solved a problem for many business men whose products have extreme grease content.

There are other types of Patapar for other problems, too—179 types in all. Is there a problem we can tackle for you?

SOME OF PATAPAR'S MANY USES

Butter wrappers
Ham boiler liners
Deep freeze wraps
Fish wrappers
Can liners
Cheese wrappers
Vegetable wraps
Bacon wrappers
Milk can gaskets
Oleomargarine wrappers
*And hundreds of others*

Protected by Patapar Vegetable Parchment

Patapar Keymark nationally advertised symbol of wrapper protection

**Patapar** REG. U.S. PAT. OFF.
**HI-WET-STRENGTH, GREASE-RESISTING PARCHMENT**

**PATERSON PARCHMENT PAPER COMPANY • BRISTOL, PENNSYLVANIA**
*Headquarters for Vegetable Parchment since 1885*
*West Coast Plant:* 340 Bryant Street, San Francisco 7, California
*Sales Offices:* 122 East 42nd Street, New York 17, N. Y. • 111 West Washington St., Chicago 2, Ill.

New FLEX-A-FOAM FILTER MASK

DUST PROTECTION YOUR WORKERS WELCOME AND **WEAR**

No respirator does any good unless workers will wear it. Even if your men won't use old-fashioned respirators—cumbersome, grotesque, stifling—they're glad to wear the new Flex-a-Foam Filter Mask. Here's why:

- *It's a featherweight—only 1 ounce.*
- *It's snug and comfortable—adjusts to any face size.*
- *It's easier to breathe and talk through than a linen handkerchief.*
- *It's smartly styled—workers don't look or feel peculiar.*

**FLEX-A-FOAM'S** filter is a honeycomb of whipped foam latex that *keeps out non-toxic nuisance dusts as small as 1/25,000 of an inch!* Frames are of new DuPont Polythene plastic—so flexible they adjust themselves to any facial contours, yet so tough they're unbreakable in normal usage.

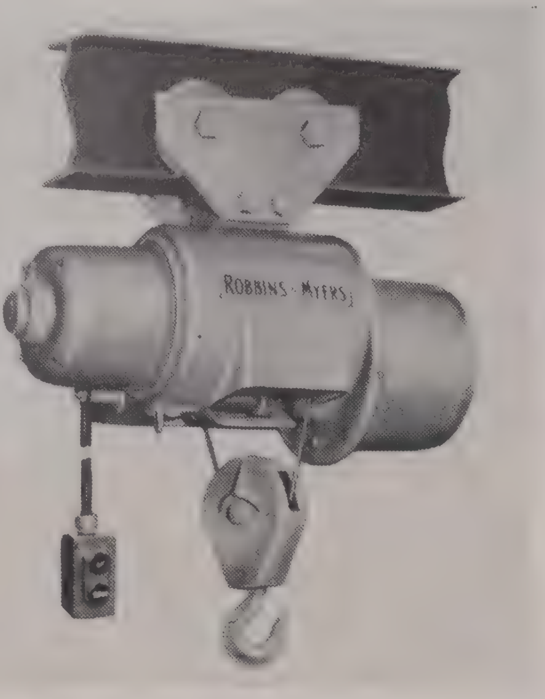
For new comfort, new efficiency—new economy, too—order Flex-a-Foam Filter Masks—lowest priced *quality* respirator on the market.

ATTENTION AGENTS AND JOBBERS
*Your interest is invited*

The Goggle Parts Company — Dept. C.
Cleveland 13, Ohio
*Please send full information and prices on Flex-a-Foam Filter Masks.*

Name__________
Position__________
Company__________
Address__________
City_____ Zone_____ State_____

THE GOGGLE PARTS COMPANY
CLEVELAND 13, OHIO



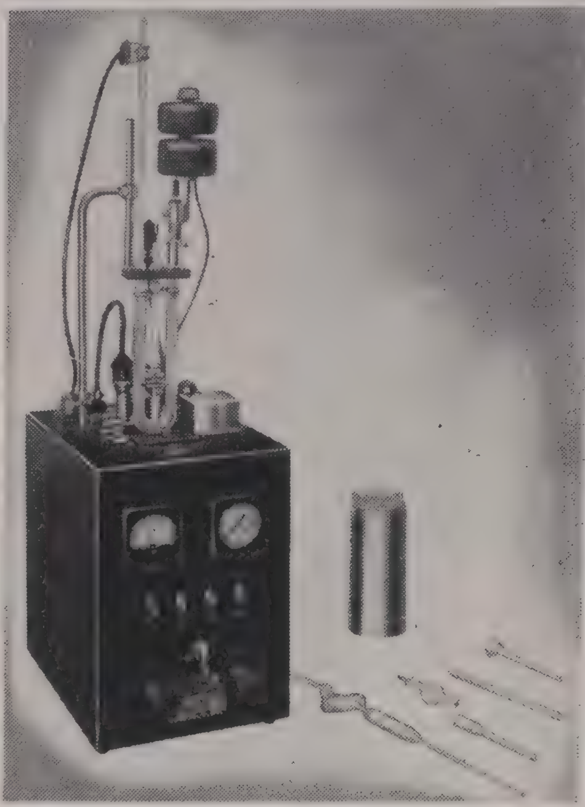
## Makes Wire Rope Hoist In Three Capacities

For stationary, hook, or trolley mounting on production floors and in receiving dock and loading areas, a lower-priced new Model "J" wire rope hoist is being produced.

Unit is available in $\frac{1}{4}$, $\frac{1}{2}$, and 1-ton capacities with pendant rope or push button control. All models are equipped with totally-enclosed, ball-bearing motors which develop high starting torques required in hoisting service. An electrically-activated, shoe-type motor brake provides instantaneous stopping; assures accurate spotting of loads.

Oversize Weston load brake, with non-reversing clutch, automatically controls speed when the load is lowered. Dropping in the event of power failure is prevented.

Safety-enclosed hook blocks and drop-forged steel hook swivels prevent uneven or jerky lifting by eliminating twisted and jammed cables. Trolley assemblies are adjustable for various beam sizes, and are equipped with ball bearing wheels.—*Robbins & Myers, Inc., Springfield, Ohio.*

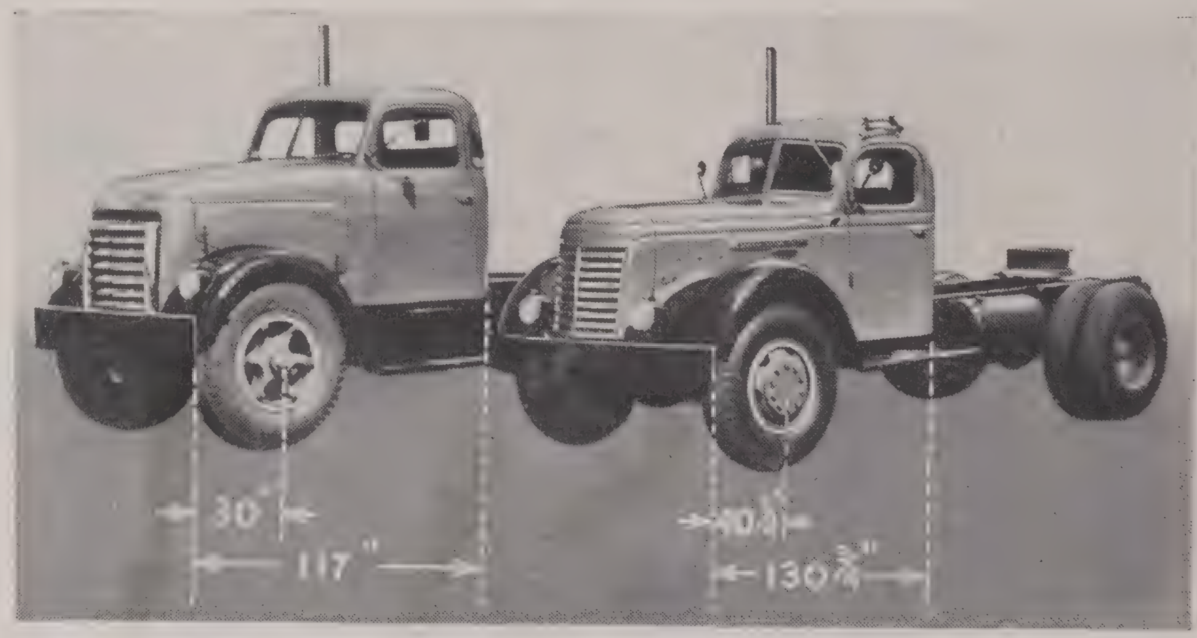


## Molecular Weight Gaged By New Apparatus

Quick and accurate determination of the molecular weights of liquids and solids can be made with new laboratory apparatus.

Determination of the molecular weights of organic or inorganic liquids or solids is made by the freezing-point method. Freezing-points or cooling curves of liquids can also be ascertained.

Operation of the small compact unit is very simple. At operator's finger tips are controls for tube heat, vacuum, tube motor, venting, dry air, and cooling. In addition, there is a



## Truck Payload Area Upped

With front-bumper-to-rear-axle measurement reduced from $130\frac{3}{4}$ in. to 117 in., new "H" line "900" series trucks offer $13\frac{3}{4}$ in. more payload area than previous designs, and permit use of powerful Diesel engines for hauling bigger, longer loads without violation of over-all restrictions.—*General Motors Corp., Detroit.*

milliammeter and a gage indicating inches of water pressure.

For determining molecular weight according to the latest A.S.T.M. D 852 method, the operator merely plugs the apparatus into the regular 115v. line and adds ice to the Dewar flask. He then determines the freezing point of an accurately weighed amount of liquid whose molecular weight is known. A definite amount of material of unknown molecular weight is added to this liquid, and the freezing point lowering is noted. The freezing point lowering enables calculation of the molecular weight of the unknown.

Cabinet of the apparatus is stainless steel with Bakelite front and top. All glassware is enclosed in the cabinet to prevent breakage. Standard equipment furnished with the apparatus includes a benzene freezing-point thermometer, buzzer for the thermometer, feeder-rod cooler assembly, powder funnel, benzene pipette, and liquid sample pipette—*Precision Scientific Co., 3737 W. Cortland St., Chicago 47.*

## Direct Mounted Motors Save Working Space

Models in a complete new line of electric motors, recently announced, are specially designed for direct connection to driven machinery.

Designated Unimount motors, they are equipped with machined brackets to mount directly on almost any driven machine, thus saving space, and improving appearance and compactness.

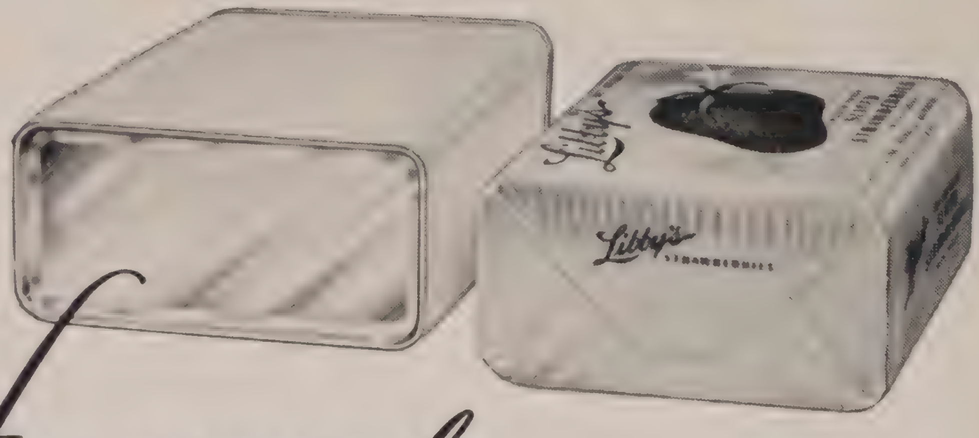
Adaptability of mountings to pumps, compressors, mixers, blowers and grinders enables the machine designer or user to make installations without changing existing machine designs or construction. In many cases, belts, chains, guards, or cumbersome power transmission devices can be eliminated.

Integral mounting brackets offering a variety of bolt circle and surface layouts (including Footless NEMA Style "C" face type, registered, and other combinations) can be supplied. —*U. S. Electrical Motors, Inc., Los Angeles 54, and Milford, Conn.*

*(Food Equipment Continued)*

Your Packaging Problem

may be no problem at all
for "PACKAGE" engineers



*for example—*

In wrapping the new metal-end fibre can, frozen food packers encountered two problems. The recessed ends of the can made it difficult to seal the end-folds of the wrapper neatly and securely. And moisture or frost, which forms on the outside of the container, was trapped under the wrapper.

Our engineering staff tackled both these difficulties. They solved the problem of making a neat fold over the recessed ends of the can by designing for our Model FF machine an end-sealing device similar to that used on our Model FA which wraps extension-edge candy boxes. This device employs a blade over which the end-folds can be neatly sealed. To permit any moisture inside the wrapper to escape, the sealing mechanism was so designed that a section of the end flaps is left unsealed. Thus cans can be wrapped before or after freezing—and whether the container is wet, dry or frosted, a neat wrap is assured.

Your packaging problem may be solved in an equally economical and expeditious manner. For we have an extensive line of versatile machines which are adaptable to a wide variety of products and styles of wrapping. Why not consult our nearest office?

*Write for our leaflet "Packages that Sell"*

PACKAGE
MACHINERY COMPANY
SPRINGFIELD, MASSACHUSETTS

NEW YORK CHICAGO BOSTON CLEVELAND ATLANTA DALLAS
DENVER LOS ANGELES SAN FRANCISCO SEATTLE TORONTO MEXICO, D. F.

*To the Food Industry*

STERLING DRUG INC.
TAKES PLEASURE IN ANNOUNCING THE FORMATION OF
STERWIN CHEMICALS INC.
WITH MR. P. VAL. KOLB AS PRESIDENT
TO DISTRIBUTE THE PRODUCTS FORMERLY SOLD BY
THE SPECIAL MARKETS-INDUSTRIAL DIVISION OF
WINTHROP-STEARNS INC.
AND
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GENERAL DRUG CO.

We feel the consolidation of these two divisions of Sterling Drug subsidiaries will enable us to render you quicker, more efficient service.

Manufacturing and research facilities are being expanded to improve present products, also develop new products and methods of aiding the Food Industry in its efforts to produce better and more nutritious foods.

P. Val. Kolb
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- VANILLIN
- CERTIFIED FOOD COLORS
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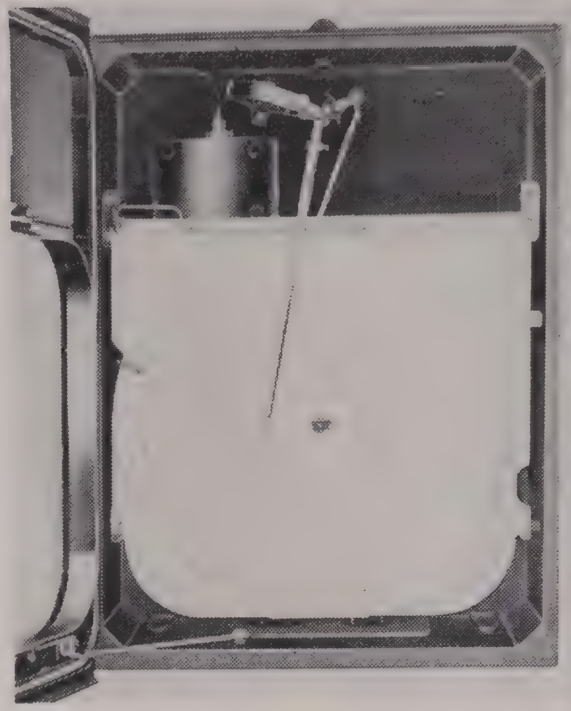


## Instrument Records Pressures In Extremely Low Ranges

A mechanical-type, recording, absolute pressure gage based on an entirely new principle has been developed. It involves a pressure-sealed lever arm so constructed that it is frictionless and free of turning moments due to changes in differential pressure across it. This design makes possible the recording of extremely low absolute pressure ranges.

These Series 500 recording absolute pressure gages are offered in ranges from 0 to 20 mm. mercury and up. Several instruments with the extremely low range of 0 to 6 mm. mercury absolute pressure have been successfully used.

Rugged in construction, the unit gives an accurate record of vacuum in terms of absolute pressure, inherently correct for barometric variations.—*The Bristol Co., Waterbury 91, Conn.*

## Water Purity Indicator Gives Rapid Check

Distilled and de-ionized water is quickly and accurately tested by a new purity indicator.

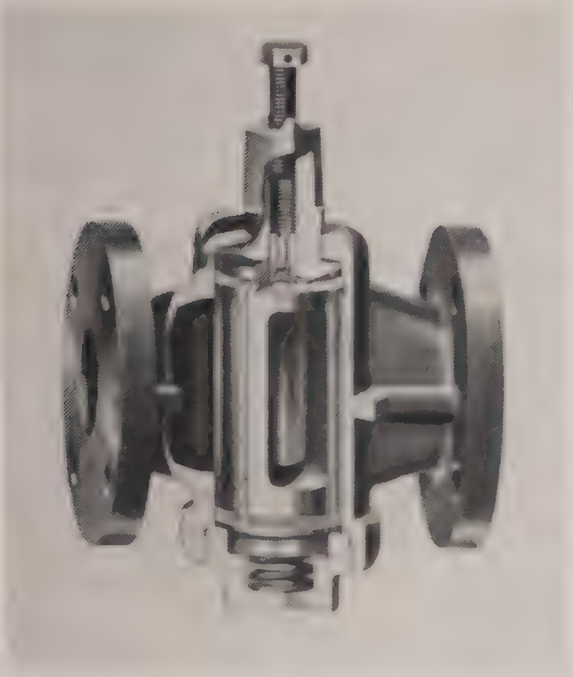
The unit operates on the principle that the conductivity of water is directly proportional to its ion content

—i.e., its degree of purity. This principle provides one of the fastest methods by which such purity can be determined.

Simple to operate, indicator can be used to give an easy, quick purity test daily, hourly, or whenever needed. It can be used for spot checking or for permanent installation.

Calibrated to zero for pure water and directly in terms of impurity content within the range of 0 to 30 ppm. of sodium chloride, this portable, compact, heavy-duty tester can be plugged into a 110v., 60 cycle, a.c. current source. Special models are available for other voltage characteristics.

Conductivity cells can be furnished: Glass dip cell for testing samples of distilled water in beakers, rubber dip cell for industrial use in testing purity of distilled water in storage tanks, and threaded cell for permanent installation in tanks or piping systems. *F. J. Stokes Machine Co., 5900 Tabor Rd., Philadelphia, 20.*



### Self-Adjusting Plug Valve Extends Leakless Service

Wear is automatically compensated for in a new lubricated plug valve. This feature is designed to give longer leakless service.

The cylindrical plug of the new valve has a wedge action, thus it not only adjusts itself for wear, but also keeps its sealing surfaces and those of the body in intimate contact at all times to provide an extra tight guard against leakage and to lower lubricant losses. Line fluid pressure also acts on the plug to promote the sealing effect.

In addition, port areas are equal to the area of standard pipe; a complete lubricant seals around the ports; and there are positive, visible stops to limit operation to a quarter turn.—*Homestead Valve Mfg. Co., Coraopolis, Pa.*

*(Food Equipment Continued)*

NEW STERI-WHITE — GREAT NEWS FOR FOOD PACKERS!
THE INSIDE GIVES YOUR PRODUCT SENSATIONAL NEW PROTECTION!
THE OUTSIDE SELLS WITH FULL-COLOR LABEL AND SALES MESSAGE!
INLAND'S
Steri-White
Outstanding New Development in Lined Containers
Inland Steri-White

Outstanding
**New Development**
in protection-lined steel containers

**Ideal for such products as —**
- Jams and Jellies
- Chocolate Syrup
- Shortening
- Malt Syrup
- Fountain Syrup
- Pie and Cake Fillings and Toppings
- Corn Syrup
- Frozen Fruits
- Fruit Concentrates

The gleaming white interior of new Steri-White lining adds invaluable sales appeal to your product. It is purity protection — and looks it!

Available in drums or pails to meet your exact needs. Exteriors can be lithographed to serve as "traveling signboards." It's the *complete* container — the perfect answer to your special problems! Get full details today!

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*Plants at:* Chicago • Jersey City • New Orleans

Outstanding New Development in Lined Containers
Inland Steri-White
Inland Steel Container Company

Send product samples for a laboratory test — or ask for a sample pail and test for yourself.
*Tear out this coupon and mail today!*

INLAND STEEL CONTAINER CO.
6532 South Menard Avenue, Chicago 38, Ill.
Check — ☐ Please send Steri-White Literature giving complete details.
☐ Please supply a sample Steri-White Container for testing purposes.

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KANSAS CITY
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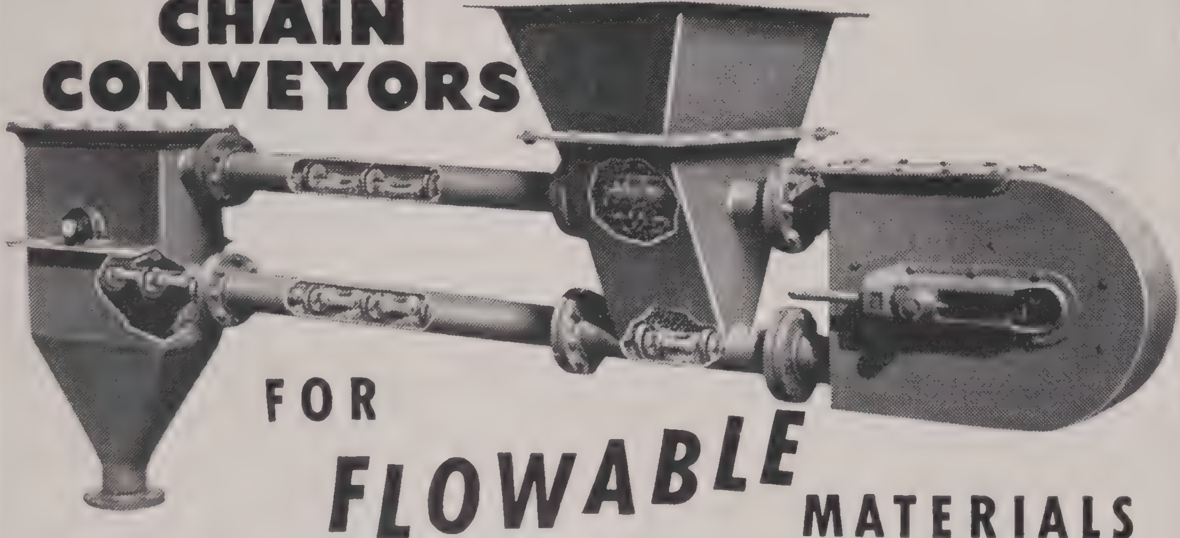
HAPMAN

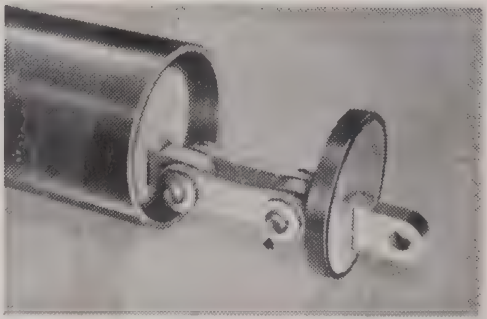
SEALED-PIN, RUBBER-FLIGHT CHAIN CONVEYORS



FOR FLOWABLE MATERIALS

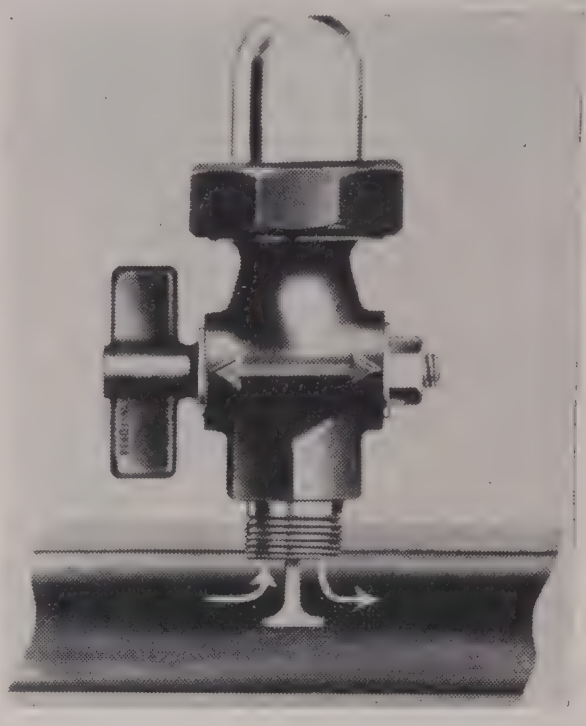
You can handle any type of FLOWABLE material at low cost per cubic foot with HAPMAN Conveyors. They have operated successfully for years and their versatility has been proven in handling all kinds of loose products from ground coffee and diatomaceous earth to crushed fish and ammonium sulphate.

If you now convey, elevate or otherwise move FLOWABLE materials, you should have our catalog on hand.



Each flight of this sealed-pin, solid link, conveyor chain consists of a layer of abrasive resisting rubber, bonded between 2 steel plates giving a rigid sanitary surface.

HAPMAN CONVEYORS, Inc. 2405 W. McNichols Rd. Detroit 21, Michigan



### For Check On Liquids

Clarity or turbidity of transparent liquids flowing under pressure through pipe lines can now be observed by means of a valve-type sight glass. Differential pressure is established across the deflector to allow some of the liquid to circulate continuously through the glass observation bowl. —*Worthington Pump & Machinery Corp., Harrison, N. J.*

---

## Equipment Briefs

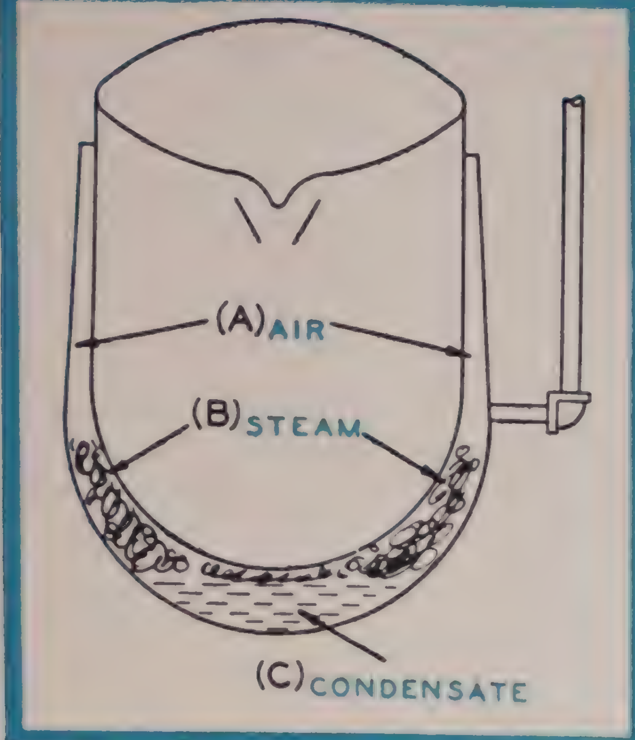
**Rubber Gloves** curved to fit hand, providing greater finger dexterity, and having a "sandpaper grip" have been developed. Neoprene coating gives protection from acids and caustics, also resists grease and oils.—*The B. F. Goodrich Co., Akron.*

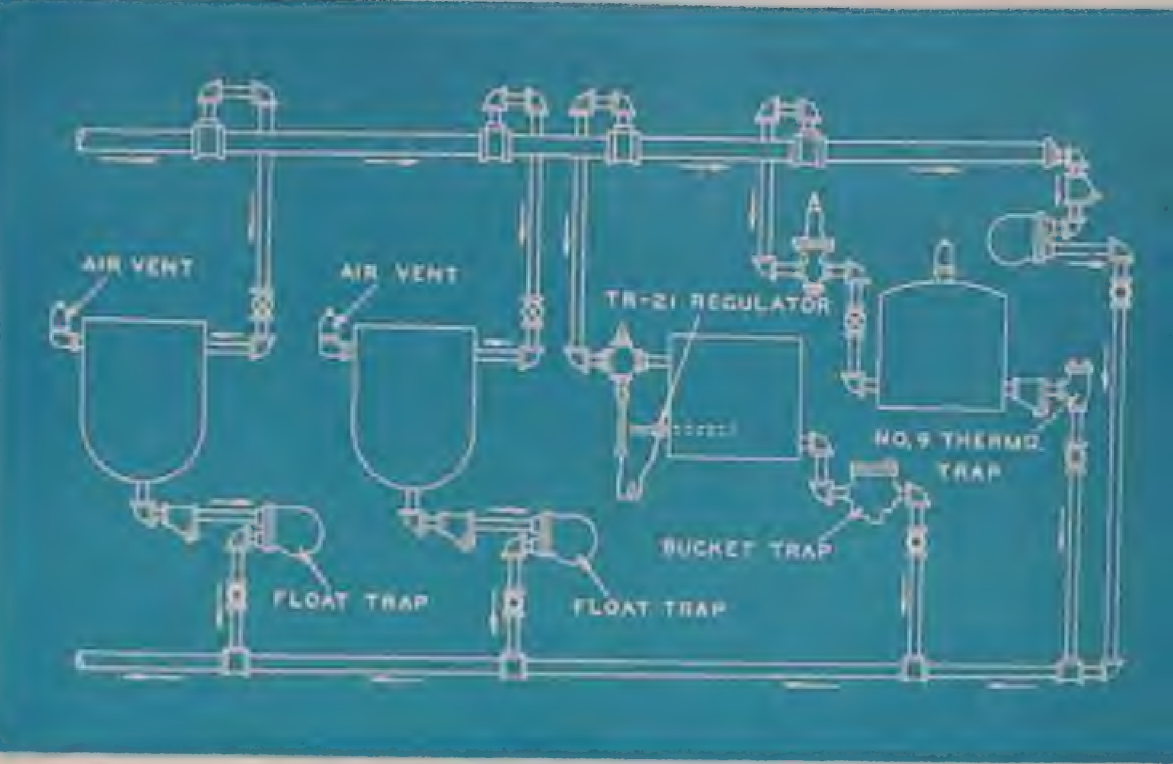
**Multiwall Paper Bags**, pyrenone treated, have been developed to give protection to bakery flour shipped into hot, humid, and insect-bearing areas. The bags have already undergone commercial shipping tests.—*St. Regis Paper Co., 230 Park Ave., N.Y.C. 17.*

**Couplings** having neoprene centers are stated to extend service life as much as ten times longer than ordinary couplings. The new units are designed for improved power transmission in fractional hp. motors used with pumps, fans, bottling and packaging machinery.—*Borg-Warner Corp., 310 So. Michigan Ave., Chicago 4.*

**Wire Filter Cloths** have resistance to severe chemical corrosion. They are made of Hastelloy nickel-base alloys. There are two grades—one for most common acids, other for applications involving oxidation.—*John A. Roeblings' Sons Co., Trenton 2, N. J.*

—*End*

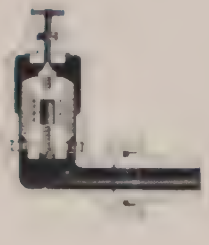


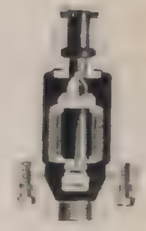


# GOOD STEAM PRACTICE

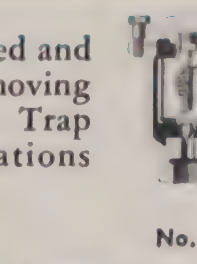
## *Simple as* ABC

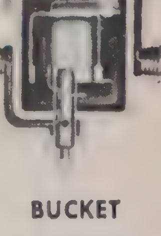
**A.** Air and other gases in steam lines or equipment not only reduce the effective temperature of the steam, but create insulated cold spots wherever there is an accumulation. These gases are constantly generated in the boiler and air is always present when starting up. Ask for Bulletin No. 275 (Air in Steam).



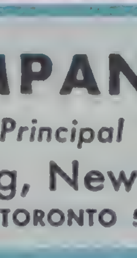


**B.** Dry steam can be delivered at the point of use only by trapping condensate from mains, risers, coils, etc. The amount of steam and therefore the temperature of the room, process, press, tank or oven, can be controlled to within a degree or two by selecting suitable Sarco Temperature Controls.

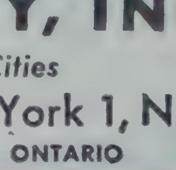




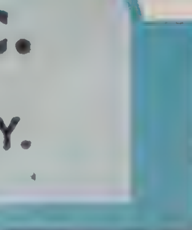
**C.** The speed of the work can be maintained and fuel efficiency insured at top level by removing condensate with the right Sarco Steam Trap based on calculations and recommendations given in Sarco Bulletin No. 1600.



No. 9



FLOAT THERMOSTATIC



BUCKET

**ASK THE SARCO MAN TO APPLY "ABC" TO YOUR PLANT**

255

**SARCO**
**SAVES STEAM**

**SARCO COMPANY, INC.**
*Represented in Principal Cities*
Empire State Building, New York 1, N. Y.
SARCO CANADA, LTD., TORONTO 5, ONTARIO

IMPROVES PRODUCT QUALITY AND OUTPUT

# New Packages and Products

Cakebits
Baumkuchen
by Helga
CAKE
+
CANDY
MADE IN CALIFORNIA

### Continental Confections Make Western Debut

Small cake squares covered with dark chocolate, and aptly named Cakebits, are among the European candy delicacies being introduced to Southern California markets by Helga Continental Confections, Los Angeles.

This newly formed company makes a variety of specialty confections prepared according to European formulas. Included in this group are nougats, marzipan and Helga-rettes.

The marzipan is a soft, chocolate-coated blend of almonds with pineapple and pistachios. Helga-rettes are composed of filberts in a creamy coffee-flavored base and wrapped in chocolate.

Candy is sold in pound and half-pound boxes colored pink and blue. Package design was developed by firm's founder, Peter O. Garner.

### Lightweight Pie Plates With Customer Appeal

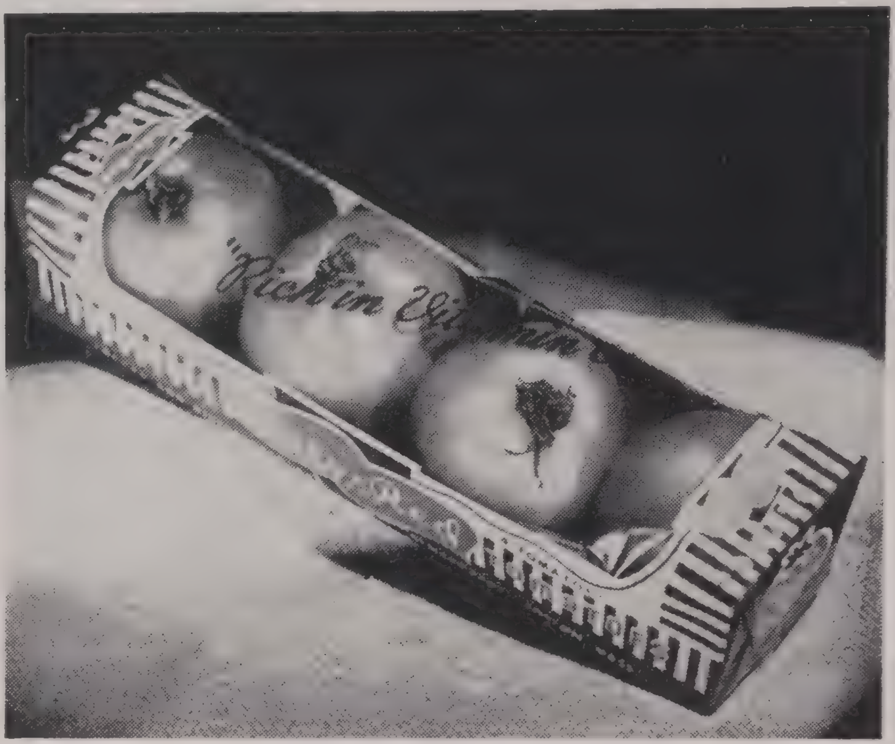
Aluminum foil plates and pans, to be used for baking as well as for packaging containers, have been developed by Foil Kraft, Inc., Los Angeles.

These new throw-away pie plates are made from .005-in. foil, yet can support 25 lb. weight. Carefully engineered lip and side corrugations, plus a unique self-support bottom, are features of the thin, sturdy pans.

Available in diameters ranging from 4½ to 8-in., the containers can be adapted to many items, such as frozen foods, pre-cooked specialties, and fruits. Quantity cost to processors is slightly above that for paper plates, but is far below tin. And deposits are unnecessary.

The plates heat and cool quickly. Their high strength is retained despite bake-oven temperatures up to 650 deg. F. Bakers have discovered that the plates permit use of less dough, with crusts thinner.

An additional advantage of the lightweight plates is that they take up only about one-sixth the storage space required for regular pie tins.



### Film's Tiny "Traps" Let Produce "Breathe"

Cellophane perforated with tiny, barely visible, trap-door-like openings—to allow passage of accumulated carbon dioxide and the entrance of fresh air—now gives pre-packaged produce a chance to "breathe".

This new wrap, developed by The Dobeckmun Co., Cleveland, offers every essential feature of the cellophane plus the important vapor transmission aspect. It is now in use by such large volume packagers as DiMare Bros., Boston, and Crossett Co., Cleveland.

Principle of the new method is rather simple. Perforations consist of a series of thin, horseshoe die cuts down the side plies of bags and over the center of overwrapped roll stock. Result, as stated, is a series of swinging trap doors. Because the cellophane is relatively stiff and springy, these normally remain closed. The semi-circular cuts serve as hinges to respond to pressure of the $CO_2$ gas from a produce package. Thus, gas is released and air enters.

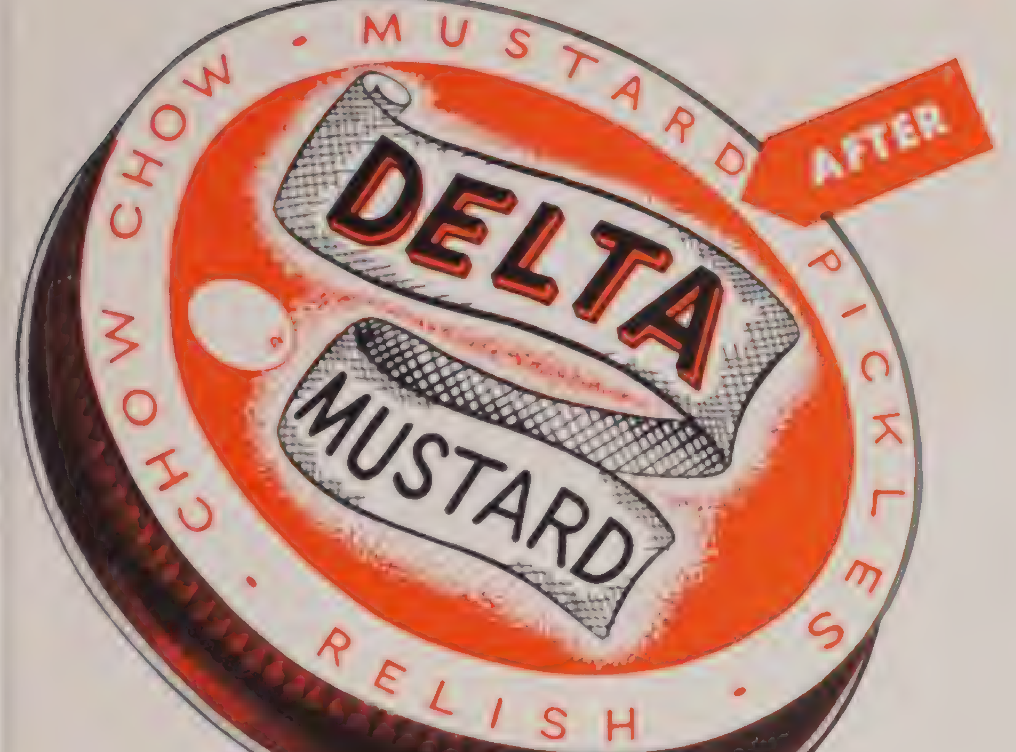
Perforations are so small that insects are practically barred from the package. This is a distinct advantage over the type ventilated with larger holes.

Breathing of packaged produce has posed a problem since the inception of transparent films. Fresh fruit and vegetables are living organisms. They emit $CO_2$ gas which, when not dissipated, frequently accelerates wilting, shrinkage, flavor loss and odors associated with decay.

Because the swinging doors normally remain closed, the moisture proof properties of the film are scarcely altered.

*(Packages and Products Cont'd)*

# Will Armstrong cap design increase your sales?

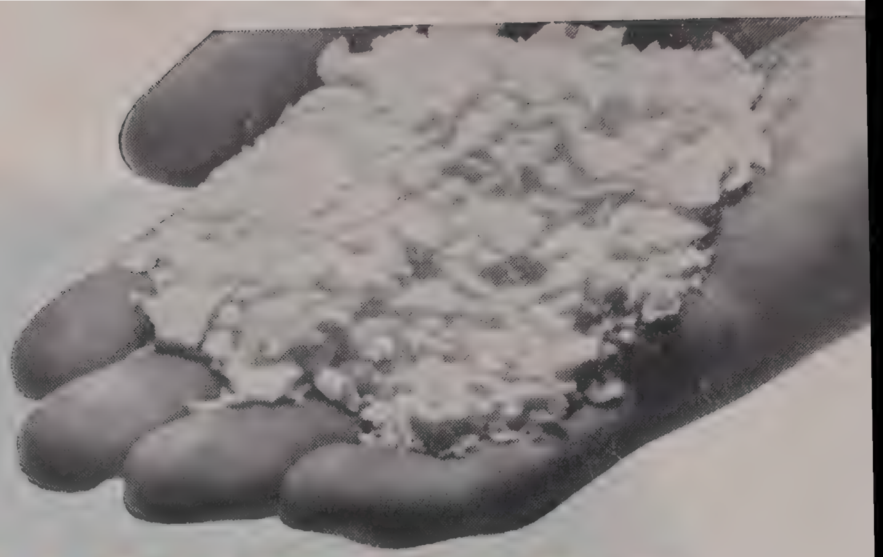

AFTER
CHOW CHOW · MUSTARD PICKLES · RELISH ·
DELTA
MUSTARD

When a customer is faced with a choice of brands . . . good cap design plays a definite part in her decision. An attractive cap design not only helps focus attention on your product, but it also increases product identity. This "before and after" illustration will give you a good idea of how Armstrong's expert package designers can create an interesting and eye-appealing design on a blank metal cap . . . make cash registers ring. Armstrong's designers will be glad to do the same for your cap. An effective design that will increase sales can be added for just a fraction of a cent per cap. For suggestions, send a sample package and market data to Armstrong Cork Co., Glass and Closure Division, 4211 Prince St., Lancaster, Pennsylvania.

**Armstrong's Closures**

TURN STANDARD CONTAINERS INTO STANDOUT PACKAGES

*Two wholesome products from natural fats and oils*



**The most powerfully dispersing**

# MONOGLYCERIDES

**ever offered in industrial quantities**

Myverol Distilled Monoglycerides are more than 90% surface-active *mono*glycerides—uniformly so. When you try them in your product formulation, you'll find you need only a small fraction of the amount of 30% to 50% monoglycerides you've been using 'til now.

Taste-free, odor-free, catalyst-free, and soap-free, Myverol Distilled Monoglycerides can be added directly to many products.

If you'd like to look into the remarkable dispersing properties of these materials and figure out the arithmetic with respect to your own profit picture, we'll be glad to send you samples, prices, and specifications.

## MYVEROL DISTILLED MONOGLYCERIDES

*Typical Specifications*

| | **TYPE 18-85**<br>A plastic fat made from refined cotton-seed oil | **TYPE 18-05**<br>A flaked solid made from triple-pressed stearic acid |
|---|---|---|
| Monoester content | 90% (minimum) | 90% (minimum) |
| Glycerol content | 2.5% (maximum) | 2.5% (maximum) |
| Color (5¼" Lovibond) | 10y/1.5R (maximum) | 10y/1.5R (maximum) |
| Free fatty acid content | 1% (maximum) (as oleic) | 2.5% (maximum) (as stearic) |
| Melting point | ...... | 70°C |
| Saponification value | 155—160 | 160—170 |
| Iodine value | 75— 85 | 3 (maximum) |
| Specific gravity | 0.964 (60°C) | 0.958 (75°C) |

"Myverol" is a trade-mark

DPi HIGH VACUUM RESEARCH AND ENGINEERING

## DISTILLATION PRODUCTS, INC.

*Subsidiary of Eastman Kodak Co.*

**723 RIDGE ROAD WEST, ROCHESTER 13, N. Y.**

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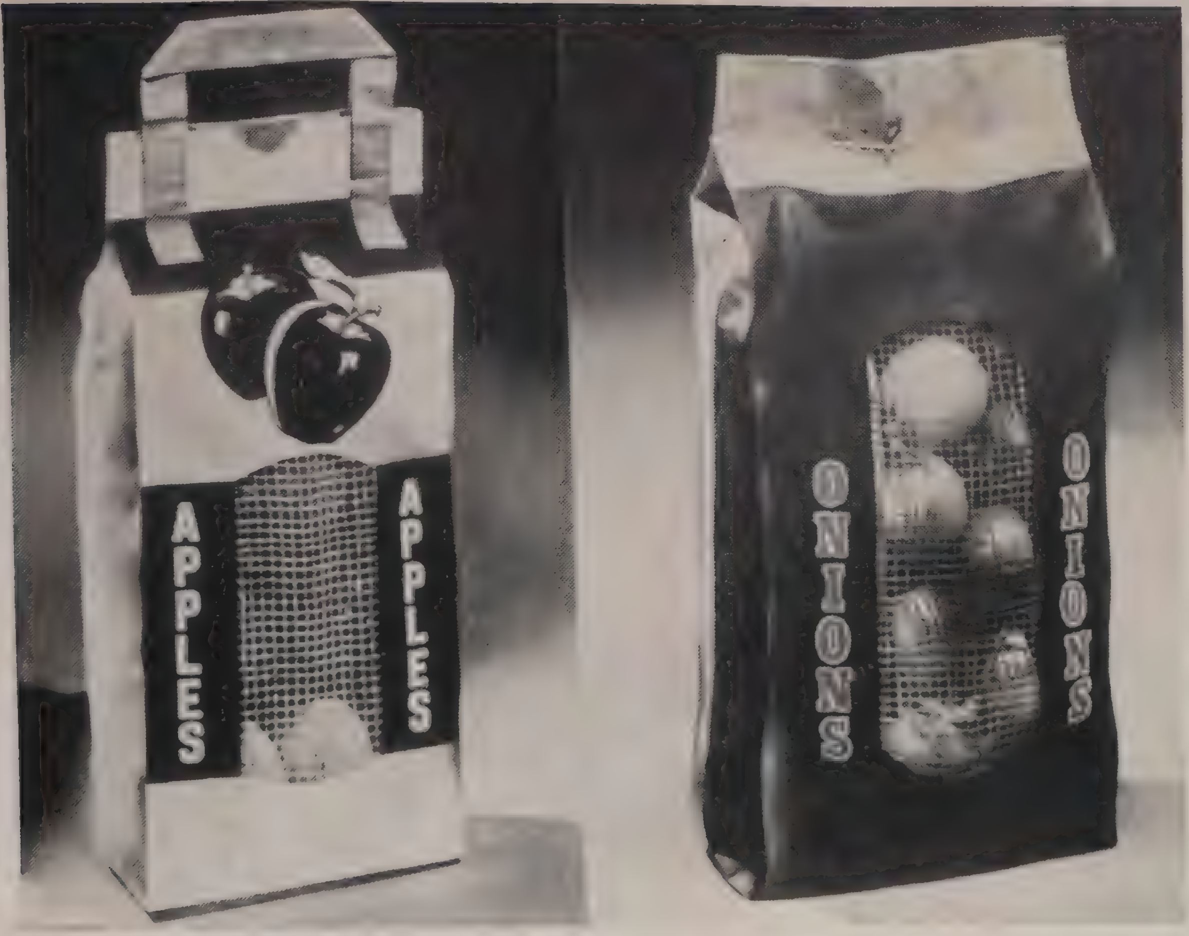
*Distillers of Oil-Soluble Vitamins and Other Concentrates for Science and Industry; Manufacturers of High Vacuum Equipment*



## For Fresh-Plus Display

Wet strength paper bags with mesh windows for aeration as well as product display, are introduced by Union Bag & Paper Corp., New York City, for the prepackaging of produce.

Called the Vent-Vu bag, it is made of two layers of paper. A special moisture resistant adhesive bonds the mesh strands between the paper walls to make the window mesh an integral part of the container.

Manufacturer states that the bags offer advantages to both packer and retailer. Because of their square bottom, the bags stand upright on packaging machines. And the uniform size speeds packing and stacking operations.

Retailers find that the bags invite impulse buying and encourage larger unit sales. Moreover, use of these new containers prevents hand-picking and thereby keeps all stock saleable.

The bags come in 5-10-15 lb. sizes, with or without the creped kraft handles.

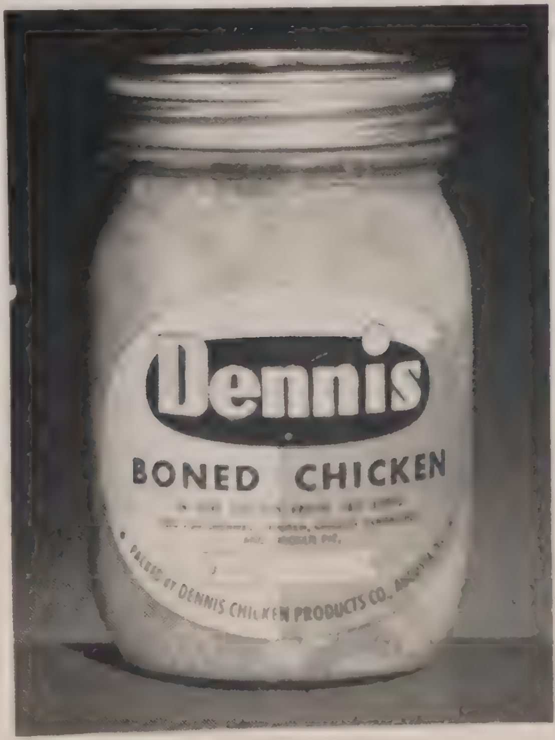
## Detergent for Zero Temperature

For removing fruit stains, blood, fatty particles and other proteinaceous material at temperatures below zero, a new synthetic detergent and wetting agent has been developed by Monsanto Chemical Co., St. Louis.

In addition, it also markedly retards the growth of mold and bacteria.

Called Santomerse No. 1, the compound is extremely stable in acid and alkaline solutions. It may be used in either hard or soft water.

Its ability to function in salt water makes it especially effective as a locker plant cleaner. Incorporated into a brine solution, it will clean the interiors of individual food lockers at temperatures as low as −4 deg. F. This eliminates the need for defrosting. The germicidal, deodorant action of the solution leaves the lockers fresh.



## Chicken In the Jar

Solid boned chicken in pure broth has recently been presented to a nation-wide market by Dennis Chicken Products Co., Augusta, Ill.

Product is packed in 1-lb. glass jars. Clear visibility of contents is an attractive aid to the shopper. Label suggests uses in creamed chicken dishes, chicken sandwiches, and chicken pie.

From a small start in a farm house

*(Packages and Products Cont'd)*

*Like Real*
OLD FASHIONED
SERVICE?

The Drake

We have over
800 people
to *serve* you!

Drake OWNER-MANAGEMENT assures you that this service will always be prompt, courteous. Our personnel strive to make your stay with us a delightful experience in warm hospitality, personal service.

EDWIN L. BRASHEARS
*President*
THOMAS BURNS
*General Manager*

*the LOOP*
*and the LAKE*
*Meet at the*
DRAKE
*Chicago*

kitchen in 1933, the firm has grown into a thriving business. Today's distribution is through wholesalers and by mail order directly to consumers.

The Duraglas jars are produced by Owens-Illinois Glass Co., Toledo, Ohio.

SHOLOM
Pure SWEET
KOSHER GRAPE WINE

### New California Kosher Wine

Made from Concord grapes, Sholom, a new light, sweet wine has recently been introduced by C. Schilling Co., San Francisco.

For the first time in California and, as far as can be determined, in the U. S., a very high sugar content has been obtained in wine without the introduction of cane sugar. The high sweetness factor of this new brand is reported derived from a newly discovered process of using grape concentrate.

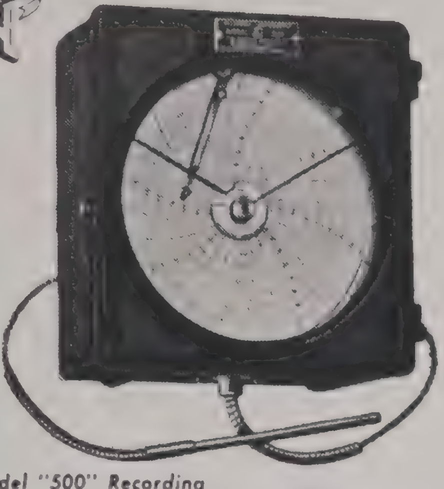
The wine is a truly 100 percent grape product and conforms to the concept that wine should be made from grapes unless otherwise specified. Alcohol content is 12 percent by volume.

Product is packaged in all sizes, from the gallon to the small 6 2/5 oz. twentieth.

### Three New Candy Bars

Kimbell Candy Co., Chicago, recently put three newly-developed coconut candy bars on the market. They are: Bar-O-Gold, a caramel-like coconut bar with vanilla flavor; Top-See, a white coconut combination with the lower half dipped in summer chocolate; and Kimbell's Coconut Bar, made with a coconut center dipped in summer chocolate.

(Packages and Products Cont'd)



Depend on
AUTO-LITE
FOR TEMPERATURE RECORDING

The low-priced Recorder shown here is precision-engineered for accuracy. Liquid-filled movement is responsive to changes throughout the temperature range. Legible 6" chart with wide selection of chart ranges between minus 40°F. and plus 550°F. Choice of 24 hr. or 7 day movement. Send for catalog showing this and many other types of Auto-Lite Thermometers.

Model "500" Recording Thermometer. Priced from $37.50.

THE ELECTRIC AUTO-LITE COMPANY
INSTRUMENT AND GAUGE DIVISION, DEPT. F-8
TOLEDO 1, OHIO
NEW YORK • CHICAGO • SARNIA, ONTARIO

INDICATING & RECORDING THERMOMETERS

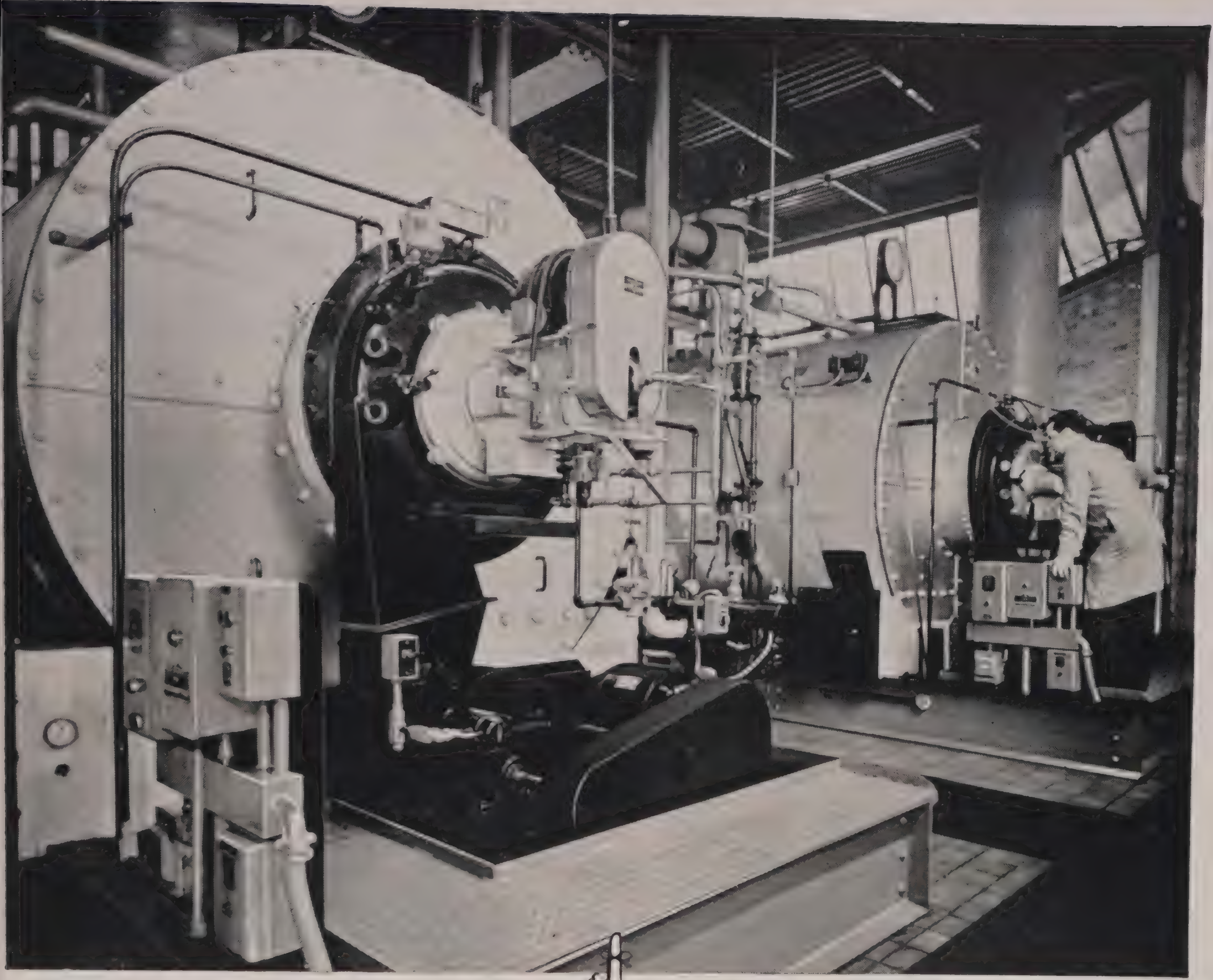
ALVEY-FERGUSON PORTA-FLOW CONVEYORS

LIGHTEST PORTABLE CONVEYOR with "PERMANENT CONVEYOR" STRENGTH

Here is the better designed and more efficient *portable* conveyor! A-F PortA-Flow Conveyors provide more load carrying capacity without sacrificing portability (a man can carry a 10' section of PortA-Flow anywhere). The exclusive roller mounting means more years of trouble-free performance. Write for folder — today!

THE ALVEY-FERGUSON COMPANY
179 Disney Street *Established 1901* Cincinnati 9, Ohio
*Offices or Representatives in Principal Cities*

CONVEYING EQUIPMENT
Alvey-Ferguson
WASHING MACHINES FOR INDUSTRY



Never Forget

# BOILERS BURN DOLLARS . . .

Yes — generating steam costs money — money for fuel, boiler operation, care and maintenance. An old or outmoded fuel-wasting boiler can burn many hidden dollars through excessively high steam costs.

It's sound business to install boilers that give you the most for your steam dollars — modern, guaranteed high efficiency Cleaver-Brooks boilers, using oil or gas as fuel.

For any boiler installation (15 to 500 HP.)—new or replacement—Cleaver-Brooks offers these immediate and long-range cost-saving advantages:

**A Custom-Planned Boiler Engineered for Your Needs:** Your steam needs and steam-using equipment are studied — your present steam load plus your estimate of future expansion are considered — with this information the size of Cleaver-Brooks Boiler best suited to your specific needs is determined.

**Factory Starting Service:** Your boiler is placed in operation by Cleaver-Brooks factory service-engineers. Your operators are trained in operation, care and maintenance.

**Flexible Operation Burning Gas or Oil With Equal Efficiency:** You can use oil, gas, or combination oil and gas, whichever is of lower cost. Through their high heat transfer, Cleaver-Brooks boilers operate at a guaranteed efficiency of 80% from full load down to 30% of rating.

In addition, Cleaver-Brooks boilers give you clean, smokeless operation — eliminate fuel and ash handling — require no high or costly stacks — no special foundations — fit under low headroom — provide quick steaming, flexible operation to meet fluctuating loads — fully meet all codes.

Available in sizes 15 to 500 HP., 15 to 200 P.S.I. — write for Cleaver-Brooks steam boiler bulletin.

CLEAVER-BROOKS COMPANY
352 E. Keefe Ave., Milwaukee 12, Wis.

WRITE on your business letterhead for Steam Cost Calculator—a ready reference slide rule showing comparative steam costs when using oil, gas, or coal as fuel. Mailed on request — no obligation.

**Cleaver-Brooks**
STEAM BOILERS

NOTHING lost.... NOTHING added

Alva True Fruit CONCENTRATES

are dependable—composed entirely of the flavor constituents from the fruit itself—Nothing lost—Nothing added. Unique extraction techniques and newly developed processing equipment retain the delicate, volatile top notes, so often lost in conventional processing and assure you of the finest in natural flavor. Outstanding in the complete ALVA line of True Fruit flavors are

Raspberry
Strawberry
Grape

— adaptable for every true fruit flavor use.

Many foods can not be suitably and economically flavored by true fruit alone. In such cases the complete and popular line of "ALVA True Fruit Extracts with Other Natural Flavors" is usually the answer.

For your special problem we offer the services of our unmatched flavor laboratories and research facilities to determine the RIGHT flavor for the particular product.

Alva FLAVORS

VAN AMERINGEN - HAEBLER, INC.
315 FOURTH AVENUE, NEW YORK 10

3 BEARS HONEY
3 BEARS HONEY
3 BEARS HONEY

## Three Bear Honey Pack

Fluted glass containers, specia molded, have replaced the convention honey jars in the line offered by Bra shaw & Sons, Wendell, Ida.

Deserting the regular 1 and 2 jars, the packer has introduced thr new sizes—24-oz. "Papa Bear Size 12-oz. "Mama Bear Size"; and t 8-oz. "Baby Bear Size". A new lab has also been developed to mainta the company identity despite the prom nence given to the three bear moti

Reportedly the largest individu producer-packer of honey in the U. S the firm also supplies the standard lb. tins and a special "Spun Honey.

FARM HOME
KOSHER
DILL
PICKLES

## Successor to the Pickle Barrel

Lightweight, no-deposit, 5 gal. metal containers are being used by the Manhattan Pickle Co., Chicago, for bulk pickle packing.

This innovation is termed one of the most unique ideas in the industry. It does away with the familiar pickle barrel.

Each can is packaged in a carton and is easy to ship and handle. The producer uses the new containers for all of his products, ranging from Farm Home Kosher Dills to Hollander and Wine Flavored Dills.

—End

# Foods stay frigid...crankshafts rigid... with the help of TIMKEN® bearings

KEEPING a compressor crankshaft turning smoothly and without deflection is especially important in a refrigeration plant where a breakdown could result in huge spoilage losses. This up-to-date refrigeration plant plays safe by using Timken® bearing equipped Baker Refrigeration Corporation compressor units throughout.

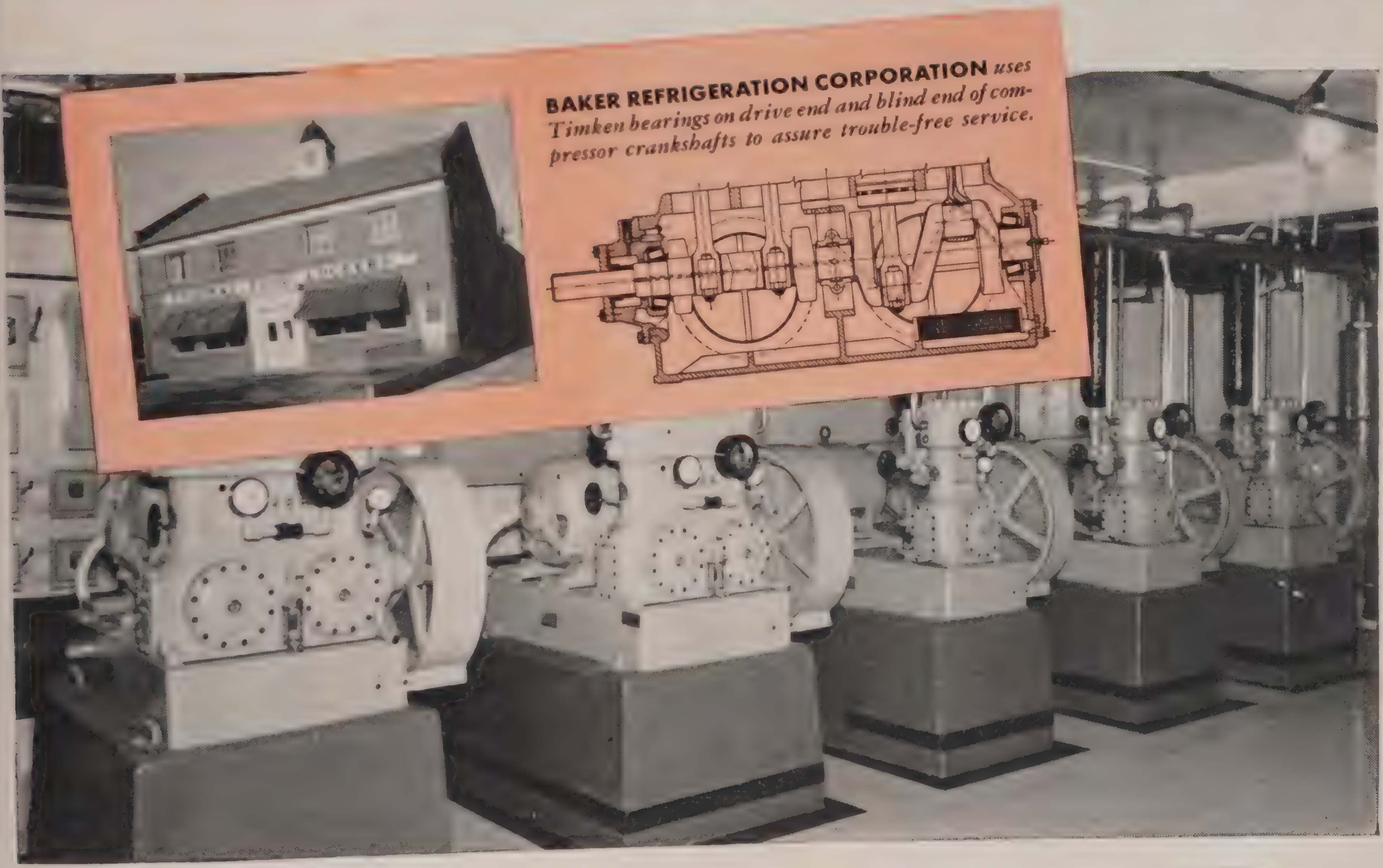
Timken tapered roller bearings are used on both the drive end and the blind end of the 4-cylinder compressor crankshafts. They keep them turning with minimum friction and without lateral play. Perfect alignment prevents wobble; wear is reduced; and machine life is prolonged. Power consumption is cut and less maintenance is required.

Timken tapered roller bearings hold crankshafts in rigid alignment. Due to line contact between rolls and races, they have extra load-carrying capacity. Because of their tapered construction, Timken bearings can carry any combination of radial and thrust loads.

Frictionless operation is assured by the smooth rolling motion and incredibly smooth surface finish of Timken bearings. They're made of Timken fine alloy steel and case-hardened for maximum wear resistance. Normally, they last the life of the machine. Maintenance time is greatly reduced because Timken bearings permit tighter closures that keep out dirt and retain lubricants.

No other bearings can give you *all* the advantages you get with Timken tapered roller bearings—backed by 50 years of bearing research and development. That's why it's so important to make sure you have Timken bearings in every machine you build or buy. Look for the trade-mark "Timken" on the bearing. The Timken Roller Bearing Company, Canton 6, Ohio. Cable address: "TIMROSCO".

*This symbol on a product means its bearings are the best.*



**BAKER REFRIGERATION CORPORATION** *uses Timken bearings on drive end and blind end of compressor crankshafts to assure trouble-free service.*

**NEW TIMKEN BEARING CUTS RUN-OUT IN HALF!**

Until now, the Timken "Zero" bearing has been the last word in bearing accuracy. Now Timken offers industry the "Double-Zero" bearing—*twice as accurate* as the "Zero"! Maximum run-out of the new "Double-Zero" bearing is only 75 millionths of an inch—*half* the 150 millionths run-out of the "Zero" bearing.

What an opportunity for manufacturers of machines where extreme accuracy is essential! Available in standard single row types, up to 10" O.D. Write for further information.

**TIMKEN**

TAPERED ROLLER BEARINGS

TIMKEN
1899 50 1949
YEARS

NOT JUST A BALL ○ NOT JUST A ROLLER ▭ THE TIMKEN TAPERED ROLLER ▭ BEARING TAKES RADIAL ↕ AND THRUST → ← LOADS OR ANY COMBINATION

# Employees like this easy-to-handle aluminum equipment

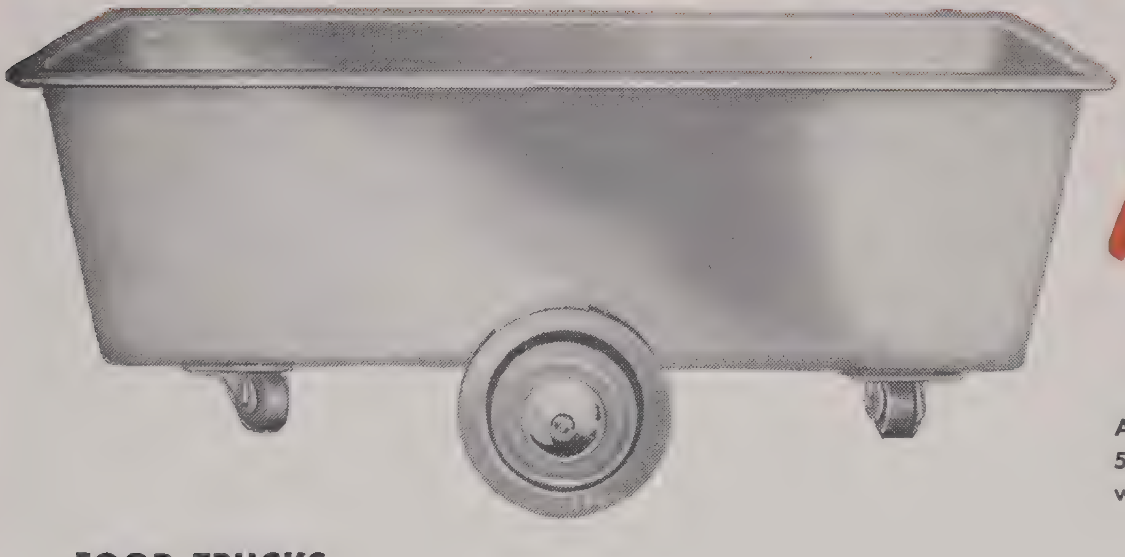
Light-in-weight Wear-Ever aluminum equipment brings cheers from the men who work with it, for it means less fatigue. It brings cheers, too, from those responsible for efficiency and *operating* costs. For the super-tough alloy from which Wear-Ever aluminum food equipment is made resists gouging and denting—gives many extra years of hard service. Mail the coupon below for full information on Wear-Ever Aluminum food plant equipment. The Aluminum Cooking Utensil Co., Wear-Ever Bldg., New Kensington, Pa.

**TUBS**

Bead and reinforcing ring on bottom closed with continuous weld. Reinforcing weld on handles. Seamless. Capacities: 56 and 65 qts.

**SEAMLESS PAILS**

Strong and durable. In natural or Alumilite finish. Capacities: 10, 12, 14, 16 quarts.



**NEW**

**SEAMLESS CONTAINER**

Available in 30 and 50 gal. sizes, with or without loop handles.

**FOOD TRUCKS**

Strong aluminum body. 14 cu. ft. capacity. Continuous welds eliminate cracks and crevices. St. John Neotread wheels.

NOW . . . MADE OF EXTRA HARD ALLOY

**WEAR-EVER**

*Aluminum*

. . . the metal that is friendly to foods

WEAR-EVER ALUMINUM TRADE MARK REG. U.S. PAT. OFF.

The Aluminum Cooking Utensil Co.
311 Wear-Ever Bldg., New Kensington, Pa.

Please send me further information about your

☐ Tubs ☐ Pails ☐ Food Trucks
☐ Ingredient Containers ☐ Complete Line

NAME ____________________
FIRM ____________________
ADDRESS ____________________
CITY ____________________ STATE ____________________

# New Technology

## Heat-Reversion Flavor in Hydrogenated Soybean Is Not Due to Unsaponifiable Matter

Two investigations have been made into the possible causes of flavor reversion in hydrogenated soybean oil. The first has dealt with the effect of double-degumming, and the second with unsaponifiable matter. Specially prepared samples and controls were evaluated by a panel, each member of which arranged the beakers in order of increasing bean characteristics by odor and/or flavor.

### Effect of Double Degumming

To be sure that the oil used would be of exceptional quality, it was extracted from No. 1 yellow beans in the laboratory. Then it was processed promptly, with particular care taken to protect it from exposure to light, air, and excessive heat at all times.

The oil was degummed twice, then refined, bleached, hydrogenated, and deodorized. The finished sample and controls were heated at 140 deg. C. in open beakers in a dark oven for 4 hr. Controls comprised 100-percent hydrogenated cottonseed oil, the same cottonseed stock containing 25, 50, and 75 percent hydrogenated soybean oil, and 100-percent hydrogenated soybean oil. The panel's flavor reversion score of the specially prepared sample was identical with that of the 100-percent commercially processed soybean oil. Failure of double-degumming to improve the heat reversion characteristics of soybean oil hardened to shortening consistency indicates that phospholipids removed by degumming are not the precursors of this type of reversion.

### Unsaponifiable Fraction Tested

To test the effect of unsaponifiable matter, the latter was extracted from soybean oil, which was then reconstituted, hydrogenated, postbleached, and deodorized. A sufficient amount of the unsaponifiable matter was then added to refined cottonseed oil to make its concentration the same as found in the original refined soybean oil. The samples were then heat-treated and evaluated for reversion. Eight out of 9 panel members picked the purified reconstituted soybean oil to be more beany—having more heat reversion—than the cottonseed oil to which unsaponifiable matter from soybean oil had been added. This and other tests led to the conclusion that unsaponifiable matter is not responsible for heat-reversion flavor in soybean oil hydrogenated to shortening consistency. Thus, both lines of investigation gave negative results.

Digest from "Flavor Reversion in Hydrogenated Soybean Oil. I. The Effect of Double-Degumming. II. The Effect of Unsaponifiable Matter," by W. G. Taylor, *Journal of the American Oil Chemists' Society*, Vol. 26, 413-18, Aug., 1949.

## CEREAL PRODUCTS

### Humidity Change Causes Checking of Macaroni

Drying is the most important operation in the manufacture of macaroni products, and improper control leads to checking and cracking. In research to discover the factors responsible for this phenomenon, the coefficient of thermal expansion, the coefficient of moisture shrinkage, the modulus of rupture, and the modulus of elasticity of macaroni products were determined. Moisture gradients present during drying were also measured, and the data were used to compute the stresses present.

A study of the relative magnitude of the stresses due to temperature and relative humidity changes shows that it is the moisture content of the air and not the temperature that causes the checking. A second cause is the disappearance of the moisture gradient that existed in the macaroni when it was in the plastic state in a stress-free condition. Reduction of the moisture gradient near the end of the drying process sets up tensile stresses in the interior and compressive stresses at the outer surface sufficient to cause checking.

Digest from "Factors Causing the Checking of Macaroni," by P. E. Earle and N. H. Ceaglske. *Cereal Chemistry*, Vol. 26, 267-86, July, 1949.

## DAIRY

### Control of Off-Flavors In Frozen Cream

Addition of a fat-soluble antioxidant to milk prior to its pasteurization and separation, will prevent development of oxidized flavors in stored cream or butter made from it, according to recent tests. Depletion of total vitamin C content of the milk before pasteurization likewise prevented oxidized flavor development in cream made from it, but the fat became unstable after 30 days at 32-34 F. following storage for 40 days at 0 deg. F.

These results were obtained when five lots of cream and two lots of butter, prepared from mixed milk, were stored at 0 to +3 F. for from 15—247 days, then at 32-34 F. for 10, 20 and 30 days. Cream and butter samples were then scored for flavors, and the stability of fat was determined by the re-emulsion test.

Two portions of milk were depleted of vitamin C by the addition of $H_2O_2$. One portion was then pasteurized at 180 F. for 30 min., the other at 190 F. for 10 min. Two additional portions containing 20 mg. ascorbic acid per l., were pasteurized at the same temperatures and held as controls, and to a third portion of the milk containing ascorbic acid, nordihydroguaiaretic acid was added in propylene glycol. Creams were then separated from these samples.

Butter samples were churned from cream separated from milk that had been pasteurized at 170 F. for 30 min. One part of butter was retained as control, and 2 percent salt was added to the other. Cream was stored in

*(New Technology Continued)*

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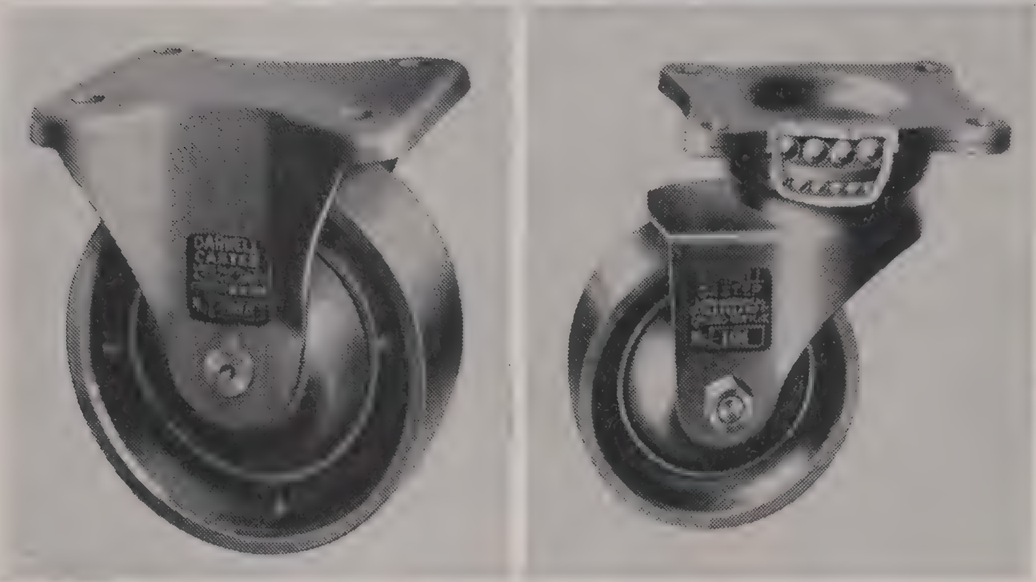

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tightly sealed glass containers protected from light. Butter was wrapped in foil.

Samples of cream separated from NDGA and $H_2O_2$-treated milk, and the butter samples, did not develop off-flavors and retained their sweetness throughout the duration of the experiments. Control creams developed oxidized flavors during storage at both 0 and 32-34 F., and the fat became unstable after 20 days at 32 F. following storage for 15 days at 0 deg. F. Fat in butter containing salt retained its stability for 247 days at 0 and for an additional 30 days at 32-34 F.

Digest from "The Effects of Nordihydroguaiaretic Acid, Salt and Temperature of Storage on the Stability of Fat and Fat-Soluble Vitamins in Cream and Butter," by V. N. Krukovsky, D. A. Theokas, F. Whiting and E. S. Guthrie, *Journal of Dairy Science*, 679-87, July 1949.

## CONFECTIONERY

### Marshmallow and Fondant Whipped Continuously

Continuous whipping, to a desired consistency, of such confection materials as marshmallow and fondant, is the object of a patented machine. It consists of an elongated, water-jacketed chamber with semi-cylindrical bottom, vertical side walls, and open top. One end of the chamber is closed, while the other is left open for discharge of the whipped material. Extending longitudinally through the chamber, and coaxial with its cylindrical bottom, is a motor-powered shaft carrying rods and vanes which whip and aerate the material and cause it to progress from the feed to the discharge end of the chamber.

Digest from U. S. Patent 2,471,769, issued May 31, 1949, on an application dated Jan. 4, 1946, to F. S. Nanna, North Lake Village, Ill.

## BAKING

### Low Temperature of Filling Abets Meringue Leakage

Quality of eggs, addition of potassium acid tartrate, type and temperature of the base on which a meringue is baked, and baking time and temperature were studied in attempts to discover the cause of beading and leakage in soft meringues. Details of experimental procedure are fully described.

Results indicate that an optimum degree of coagulation of egg proteins is an important factor in controlling beading and leakage. Conditions favoring over-coagulation gave excessive beading; incomplete coagulation re-

*(New Technology Continued)*

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sulted in excessive leakage. The dominant factor was the temperature of the base on which the meringue was baked. Greatest leakage and least beading were observed with meringues baked on cold fillings (59 F.), where the internal temperature of about 158 F. was insufficient to cause complete coagulation. The reverse was true when the meringue was baked on hot fillings, 131–140F., where the internal temperature was about 18 deg. higher than on cold fillings. Observations on time and temperature of baking indicated that the length of time a meringue is held at a temperature within the coagulation range is a more important factor in minimizing leakage than the maximum internal temperature reached. Egg quality and addition or omission of potassium acid tartrate had little effect on leakage in comparison with the other factors.

Digest from "Factors Affecting the Beading and Leakage of Soft Meringues," by E. E. Hester and C. J. Personius, *Food Technology,* Vol. 3, 236-40, July 1949.

## FRUITS AND VEGETABLES

### Fruit Juices Change Color Due to Heat and Oxygen

Effects of time and temperature of storage, and the relationship of oxygen, light, sugar, pH, and antioxidants to color changes in fruit juices have been investigated. Experimental packs, with and without sugar, of blueberry, black cherry, currant, grape, red raspberry, strawberry, and tomato juices were prepared, processed and stored under similar conditions. The pH was adjusted to a range 0.5-0.75 units above the original value. For study of the effect of oxygen, one portion was aerated and another deaerated. To another lot, ascorbic acid was added. A second aspect of the investigation was the effects of these same factors on the color of anthocyanin pigments isolated from strawberries and currants. Storage studies covered six months at various temperatures in the dark and daylight.

High temperatures and oxygen content were responsible for color deterioration during storage. Exposure to light had little effect on color of juices, but caused a bleaching of the anthocyanin pigments. Adjustment of pH values had little, if any, effect on deterioration of juice colors, but some effect on the pigments. Sugar was without effect on the color of juices or pigments. When used as an antioxidant, l-ascorbic acid gave no protection for color stability. With all juices except blueberry and grape,

(New Technology Continued)

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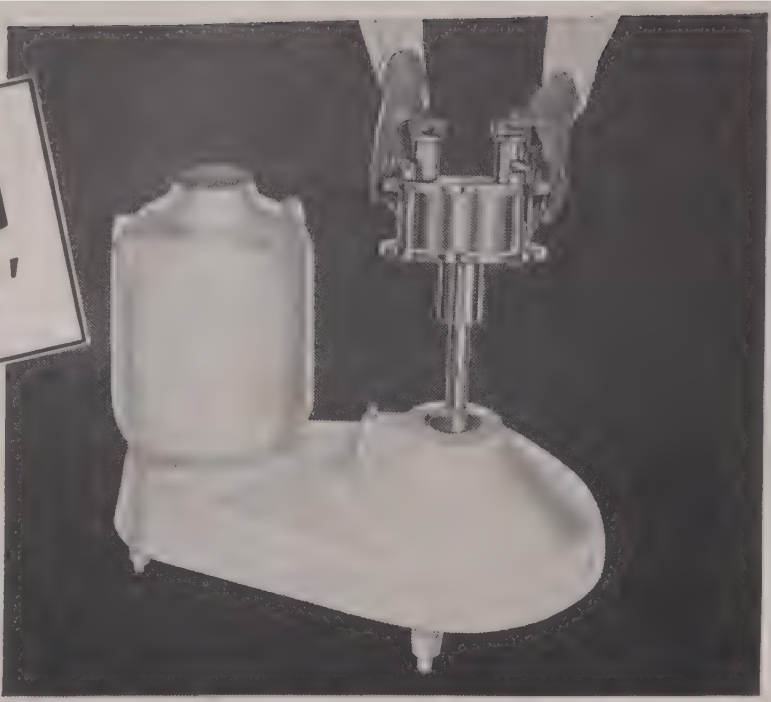

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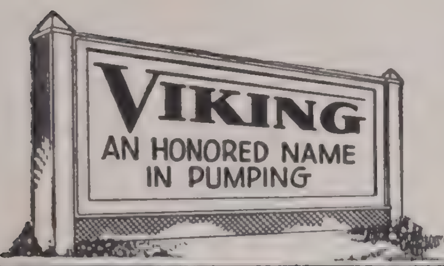

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progressive bleaching resulted from addition of ascorbic acid; and when added to anthocyanin pigments it caused complete decolorization. Stability of the color of strawberry fountain syrup was enhanced by increasing sugar and/or citric acid concentration.

Digest from "Stability of Color in Fruit Juices," by E. A. Nebesky, **W. B. Esselen, Jr.**, J. E. W. McConnell and **C. R. Fellers**, *Food Research*, Vol. 14, 261-74, May-June 1949.

### Maturity Dates of Vegetables Forecast by "Heat Units"

Scheduled planting of peas, sweet corn and snap beans to eliminate harvesting gluts is proving effective in areas growing large quantities of these vegetables for canning. Known as the "heat unit" system, it is based on 3 factors: (1) Total number of heat units required by each variety; (2) average number of heat units per day during growing season; and (3) daily accumulation of heat units during the current planting season. (Heat units equal: The mean daily temperature minus 40 multiplied by 24.)

In scheduling each day's planting, the estimated yield per acre is divided into the daily capacity of processing equipment. The rate of accumulation of heat units is the factor that determines the rate of maturity and therefore is used in spacing planting dates. In general, about 800 units will be added daily at harvest time. If plantings are spaced approximately 800 heat units apart, maturity should fall on successive days.

Digest from "Heat Units—A Measure of Maturity of Peas," by C. B. Sayre, *Farm Research*, Geneva, N. Y., 13, July, 1949.

## FISH

### Ultra-Violet Detects Shell In Picked Crab Meat

Inspection under ultra-violet radiation allows easy detection and facilitates removal of small fragments of exterior shell and interior skeletal material from picked crab meat. These fragments contain materials which, when exposed to ultra-violet rays, fluoresce due to conversion of the invisible rays into visible light. A secondary effect of the exposure is that certain of the rays have a lethal effect on contaminating microorganisms.

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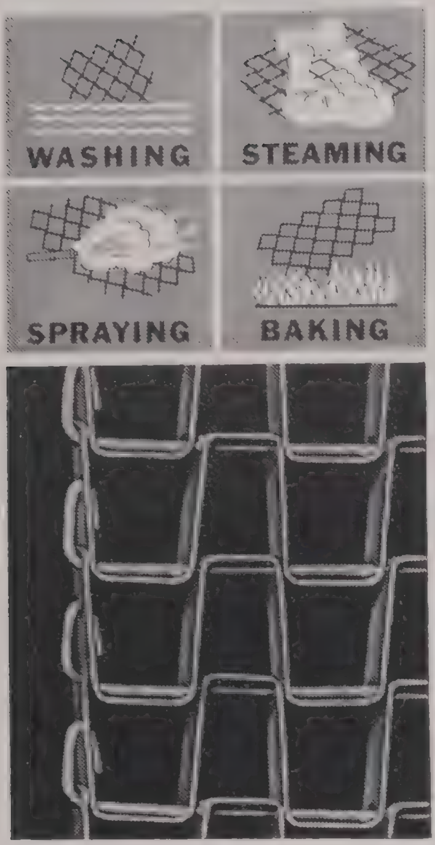

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the box. When a tray of crab meat i placed in the box, the bluish fluorescence of the shell fragments is readily visible to the observer. The rays that cause most of the fluorescence have wave lengths of approximately 3,500 Angstrom units.

Digest from "Ultra-Violet Rays for Detecting Shell in Picked Crab Meat," by S. W. Roach, *Progress Report of the Pacific Coast Stations,* 39, Vancouver, B. C., July, 1949.

## VITAMINS

### Ascorbic Acid Retention Aided By Cold Storage

Ascorbic acid values for raw and canned corn, peas, green beans, lima beans and spinach have been determined, with special reference to the effects of time and conditions of storing and washing the freshly picked vegetables. So-called "field samples," hand-picked just before the crops were harvested, were analyzed within 30 min. after leaving the field. This was from 1-3 hr. before analysis of the samples designated "prompt handling" in the storage series. Other samples were analyzed still later, with note of the commercial handling procedures. Of the lots that were canned, one can from each storage sample was opened for ascorbic acid analysis.

Summarizing the tabulated results: For comparable storage periods, cold storage gave better ascorbic acid retention than storage at outdoor temperatures, especially since the holding time increased. Holding peas and lima beans in running water decreased ascorbic acid retention. Washing before holding definitely increased ascorbic acid retention of lima beans, but made little difference in peas. A 10 percent wash of calcium propionate decreased retention in lima beans. Corn showed little change as a result of any of the treatments used.

Digest from "The Nutritive Value of Canned Foods. II. Changes in Ascorbic Acid of Vegetables During Storage Prior to Canning," by P. Paul, B. Einbecker, L. Kelley, M. Jackson, L. Jackson, R. E. Marshall, W. F. Robertson, and M. A. Ohlson, *Food Technology,* Vol. 3, 228-31, July 1949.

### Vitamin A In Cod Livers Decreases In Summer

Pacific cod livers are a marginal source of vitamin A that may be utilized at a profit under favorable market conditions. This was determined in 1947, when large quantities of livers were brought to Seattle for processing.

As the season advanced from May to August, oil content of livers increased while the vitamin-A potency of the oil decreased. During July and

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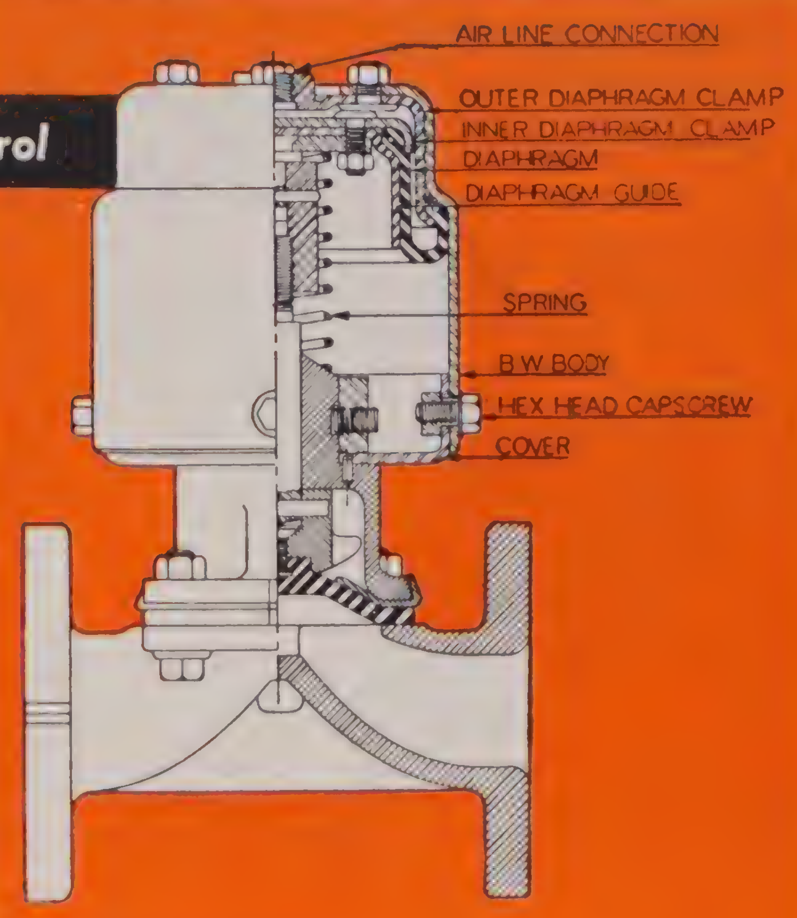
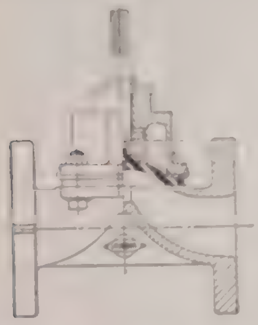


air to close, spring to open



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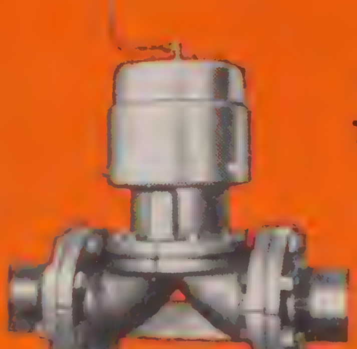

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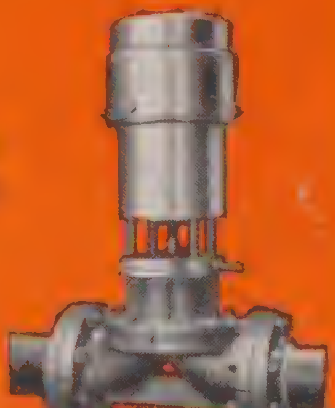

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August, however, the change in v tamin-A potency of the oil was n great, and the vitamin A per unit o liver remained almost constan Weighted average for the entire catc was 1.29 million units vitamin A pe lb. of liver. Vitamin D potency o composite oil was 200 USP. units per g

Digest from "Vitamin A and D Potencies o the Liver Oil of Pacific Cod," by F. B. Sar ford and H. W. Nilson, *Commercial Fisheri Review,* 13-15, May 1949.

## MISCELLANEOUS

### Sweetening Ingredient From Fruit Material

An improved method for separating the sweetening ingredients from fruit material in the form of an aqueous solution which can be readily processed into a sweetening medium, is the aim of a recent patent. The method comprises addition of water to the fruit and grinding to a fine, juicy pulp. An alkaline material such as lime is added to raise the pH of the pulp above 9, and there follows heating to free the juice from the pulp. Filtration separates the extracted liquid, which is further treated to eliminate impurities.

Digest from U. S. Patent 2,466,014, issued Apr. 5, 1949, on an application dated Feb. 12, 1942, to A. M. Erickson, and J. D. Ryan, and assigned to Barron-Gray Packing Co., San Jose, Calif.

### Sulphydryls In Milk Solids Depress Loaf Volume

Improperly treated nonfat milk solids are known to soften the dough and depress the loaf volume of bread. And the serum protein fraction of the milk is the responsible component. In the belief that such powerful reducing groups in the protein as the sulphydryls might be involved, research was undertaken to determine the effect of heat-treatment on the activity of these groups. Serum protein sols were prepared, heat-treated in nitrogen, and the sulphydryl groups determined by titration with o-iodosobenzoate. Other studies were made in which the sols were heated in the presence and absence of air, and the sulphydryl groups determined by three methods—thiamin disulphide, ferricyanide, and o-iodosobenzoate.

In the sols heat-treated under nitrogen, the titratable sulphydryl groups decreased progressively as the heat-treatment was made more drastic. In the tests on sols heat-treated in air and nitrogen, a decrease in sulphydryl groups available to o-iodosobenzoate only occurred in air. Both thiamin

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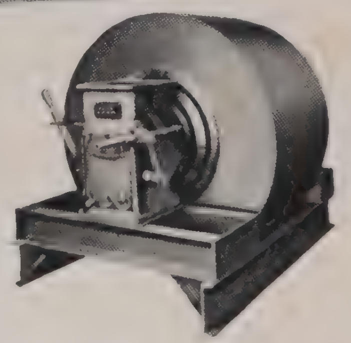

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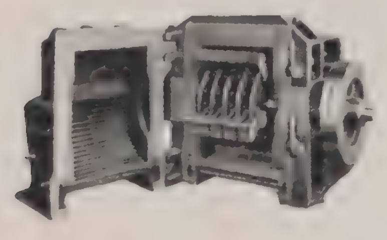
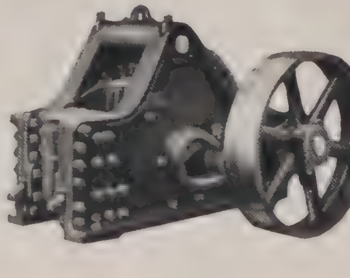


**SWING-SLEDGE MILLS**

For coarse and medium reduction (1″ to 20 mesh). Open-door accessibility. Soft, moderately hard, tough or fibrous substances. Built in several types and many sizes.



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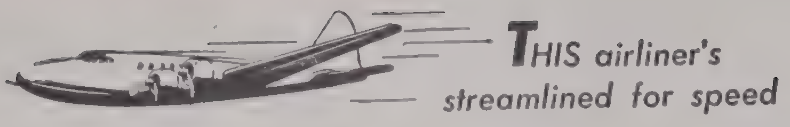

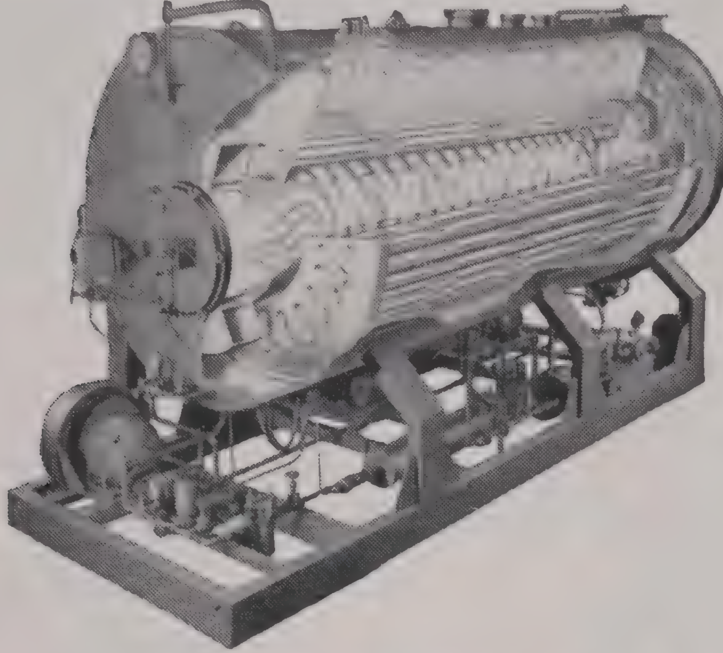

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disulphide and ferricyanide gave lo titers for unheated samples, compare with o-iodosobenzoate, but heat treatment increased the groups available t these reagents.

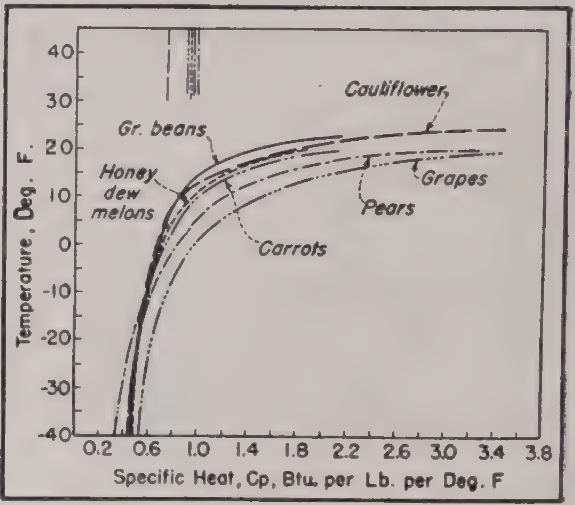
The decrease in sulphydryl groups produced by heating coincides with th loss of dough-softening action, an explains the improvement in the baking value of nonfat milk solids that can be effected by proper heat-treatment of separated milk before drying.

Digest from "Effect of Heat Treatment o the Sulphydryl Groups of Milk Serum Proteins," by R. A. Larsen, R. Jenness and W. F. Geddes, *Cereal Chemistry*, Vol. 26, 287-97, July, 1949.

## Specific Heat Determinations Show Surprising Results

In an attempt to establish a true relationship between the specific heat and physical properties of foods, specific heats of a number of fruits and vegetables, in the temperature range −40 to +40 F., have been determined by use of a specially designed large bomb calorimeter. Meats were also tried, but without success since the fat forms a thick jelly.

Previously, specific heats for foodstuffs were calculated from data published by Siebel in 1892. These were based on the assumption that foods are water and solid matter, and that the heat capacity of each is independent of the other. This gives a single value for a particular food above and a single value below the freezing point.



Data obtained in the present study indicate that specific heats of fruits and vegetables do not follow Siebel's rule. In the freezing range, the sp. ht. increases nearly logarithmically with temperature rise to the initial freezing temperature. Above this temperature, the sp. ht. drops almost instantaneously to just under 1 and is approximately constant for further temperature increases. These changes are shown in the accompanying graph.

Digest from "Specific Heats of Foodstuffs," by H. E. Staph, *Refrigerating Engineering*, 767-71, 829, Aug., 1949.

—*End*

# FINDINGS OF FACT CONFIRM HIGH VALUE OF ENRICHMENT

ENRICHMENT has been elevated to a new high level of national and social significance. The far-reaching Newfoundland Nutritional Surveys* have decisively demonstrated the part that flour and bread enrichment can play in reducing infant mortality, lowering the tuberculosis death rate and over-all death rate, decreasing signs of malnutrition, and increasing the alertness of children and grownups alike.

### BEFORE ENRICHMENT

The first of these large-scale fact-finding surveys was conducted in 1944. Signs of malnutrition were widespread. Infant mortality and tuberculosis death rates were two to three times as high as in similar populations. Enrichment with thiamine, riboflavin, and niacin was then put into effect.

### AFTER ENRICHMENT

Four years later, in 1948, the second survey showed a dramatic reduction in signs and symptoms related to deficiencies of these essential nutrients. Gone to a great extent was the apathy so noticeable in 1944. Deaths from tuberculosis had decreased sharply, and the rate of stillbirths and infant deaths was strikingly reduced.

> *"Nutrition . . . has its significance in its relation to health. Health is defined in the World Health Constitution as follows: 'Health is the complete state of physical, mental and social well-being, not just freedom from disease and infirmity.'*
>
> *"What can nutrition do? It can prolong life, give better bodies; make people happier, give them greater economic status; provide opportunity for greater social significance."*
>
> *—National Health Assembly, May 1-4, 1948*

NEWFOUNDLAND

### A CHALLENGE AND OPPORTUNITY

Here is a clear-cut confirmation of the high value of bread and flour enrichment to the national health. Here is a challenge to America's milling and baking industries, which have the enviable opportunity of bringing more buoyant health and greater physical and mental vigor to the people of America—through ENRICHMENT.

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**These surveys were supported by the Newfoundland Government, the Newfoundland Tuberculosis Association, the individual investigators, and Merck & Co., Inc.* (The Canadian Medical Association Journal, *March 1945 and April 1949.*)

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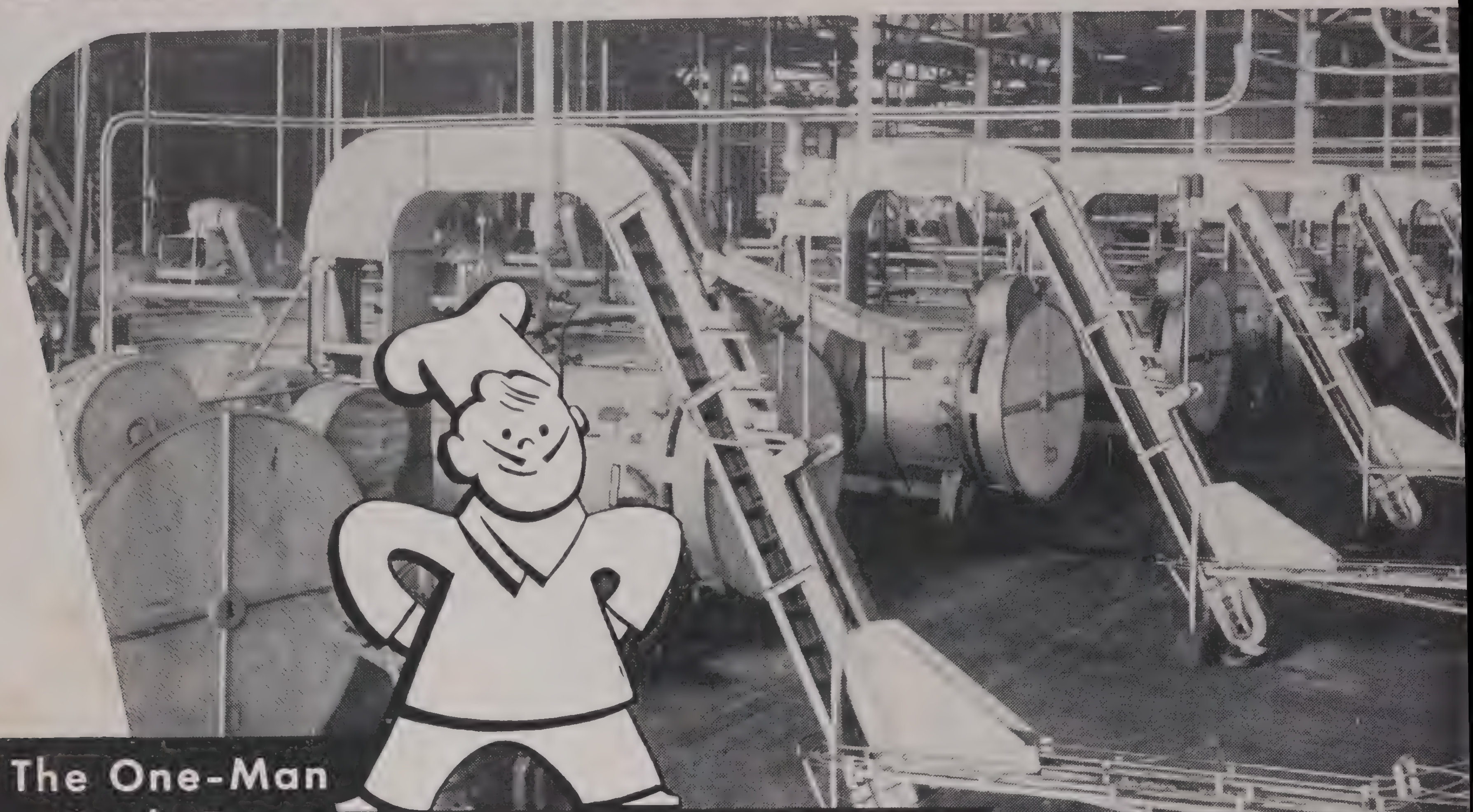

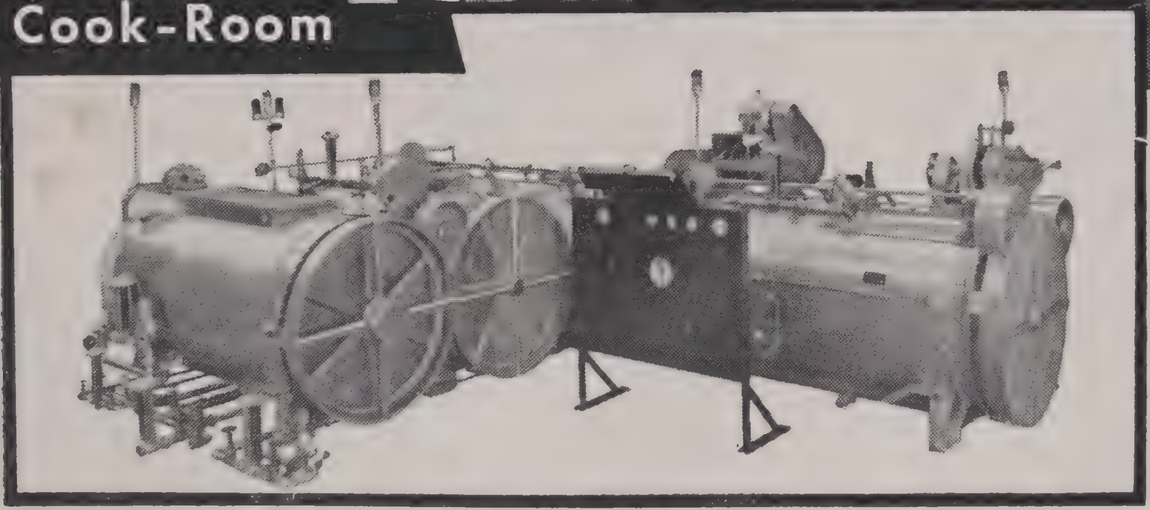

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# Convention Report

## Packers Need Less Fat, More Lean

American Meat Institute hears government and industry representatives on surplus lard and prepackaging

Fats and oils garnered a major share of attention at the 44th annual meeting of the American Meat Institute, in New York City in late September. With production for 1948-49 about equal to the 1943-44 record year, and prospects for a new record high in 1949-50, the industry is faced with a serious glut. The picture is further complicated by the rapid expansion in soybean output.

The coming year's increase, moreover, will be largely in the animal fat group, according to Charles E. Lund, chief, Fats & Oils Section, Department of Commerce, who placed the output of vegetable oils at from 200- to 250,000,000 lb. lower than in the 1948-49 season. Mr. Lund also thought it probable that fats and oils exports would drop in the coming year.

With the 1949 pig crop estimated at 96,000,000 head, 13 percent greater than in 1948, Mr. Lund foresaw at least 100,000,000 lb. of lard added to our domestic stocks, unless per capita consumption should be increased. He added that it appeared more than ever desirable for the industry to swing toward the meat type rather than the fat type hog.

### Find New Outlets

Fat of hogs was also discussed by T. C. Byerly, Animal Husbandry Division, USDA. In 1947, he said, the average pig produced enough pork for two persons and enough lard for two-and-a-half persons. We must, therefore, find new or extended uses for lard or produce leaner pigs. Mr. Byerly thought the solution would probably come from both directions.

A pig must be sufficiently fat, he continued, to produce a firm carcass. Research at Beltsville, Md., indicated that pigs on a typical diet, consisting largely of corn with adequate protein and mineral supplements and green forage, or alfalfa hay or meal, must have at least 1½ in. of back fat to yield firm carcasses at 225 lb. live weight. It is possible, he thought to obtain a firm carcass in a 100-lb. pig with only 0.8 in. of back fat on a diet consisting chiefly of potatoes or polished rice or barley with skim milk.

The surest and quickest way to increase the proportion of meat to lard, Mr. Byerly said, is to produce more pigs and market them at lighter weights. He pointed to recent observations made by Oscar G. Mayer, who pointed out that if the same feed fed to hogs in 1948 had been used to produce pigs weighing 225 lb. *each*, instead of the 225 lb. *average* that went to market, 500,000,000 lb. more lean cuts and 750,000,000 lb. less lard and fat cuts would have been produced.

### Feeding Problem

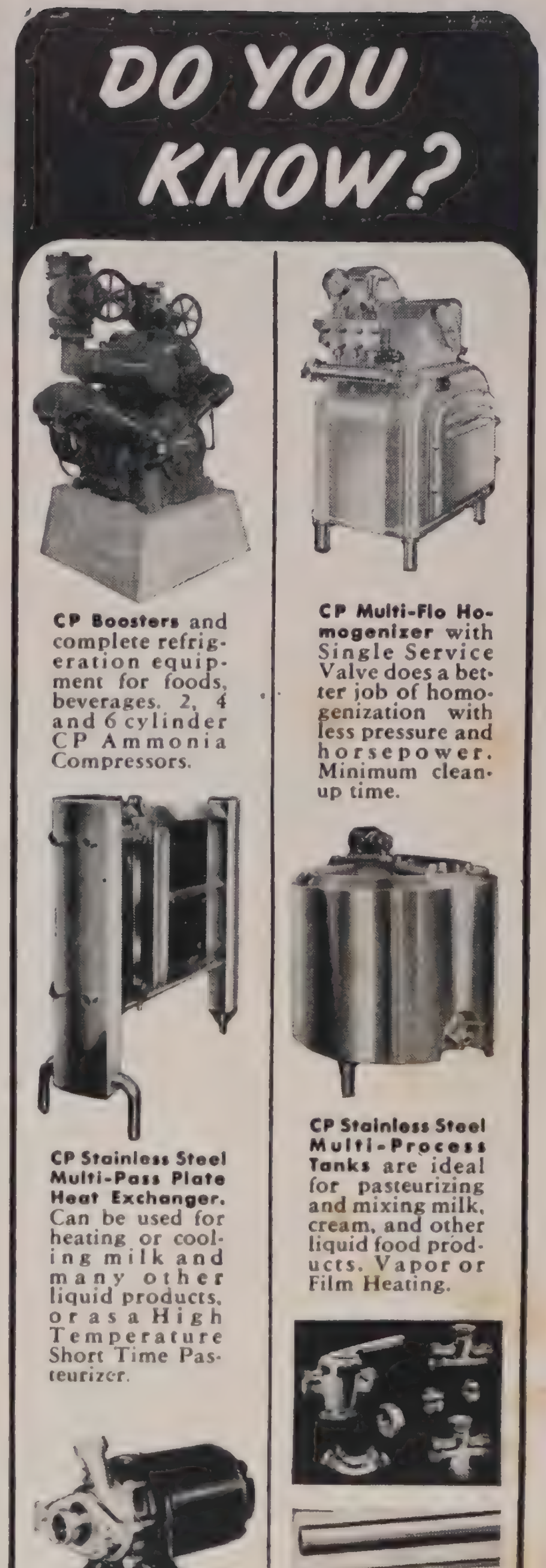
Producer control of lard production, however, brings up another problem! A major portion of commercial pigs are produced on self-fed corn and a supplement either hand-fed or self-fed. Research, he said, is needed to determine whether a protein concentrate exists or can be devised that will induce pigs self-fed on corn to balance their diet at a protein level that will assure a high proportion of lean meat.

John F. Krey, board chairman of the Institute, pointed up the price decline in lard along with the competition afforded by synthetics, particularly emulsifiers for use in bakery goods. From a selling vantage of $5.50 per cwt. above the price of hogs, in 1910, lard has declined to a point where in 1949 it was $6 lower per cwt. than the cost of the hog.

Mr. Krey, like the previous speakers reported, urged more hogs at lighter weights and further advocated an increase in our entire livestock population. In addition to increasing our meat production, large livestock numbers, he pointed out, go hand in hand with soil building and conservation.

### Self-Service Meats

Improved quality has enabled the Kroger chain to use meat as a major merchandising push, according to the Kroger Co. president, Joseph B. Hall. He spoke of the evolution of self-service meats, declaring the trend is accelerating. At present, he said, cutting and wrapping in stores are necessary because of the small volume. Mr. Hall predicted, however, that fresh meats will eventually be packaged at a central point by the meat companies. When that time arrives—and it is not too far distant—the meat packer will have brand identification on the con-



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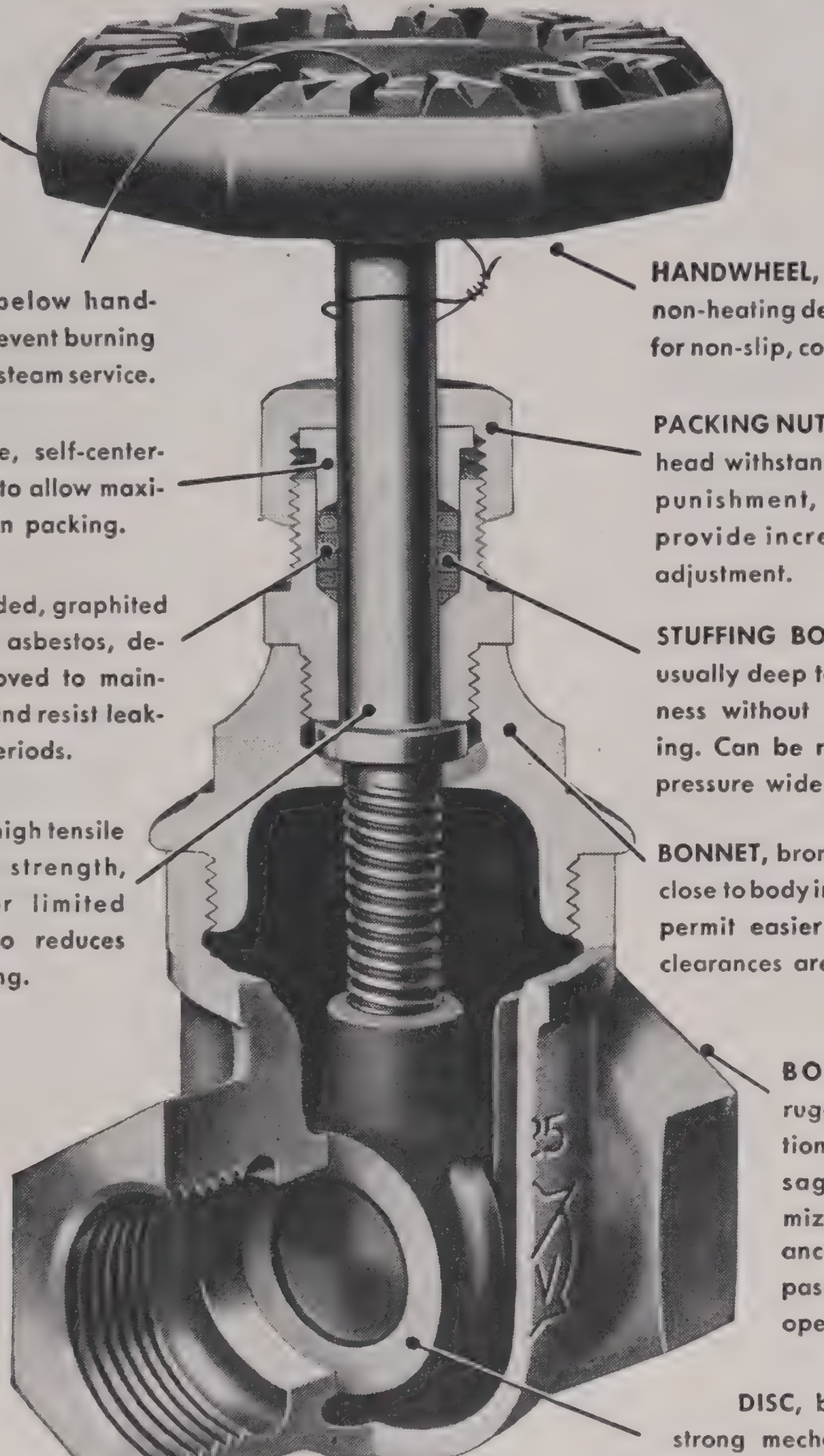

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**STEM**, bronze, high tensile and torsional strength, non-rising for limited headroom, also reduces wear on packing.

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**PACKING NUT**, bronze, heavy head withstands pipe wrench punishment, extra threads provide increased packing adjustment.

**STUFFING BOX**, bronze, unusually deep to provide tightness without jamming packing. Can be repacked under pressure wide open.

**BONNET**, bronze, large hexes close to body increase rigidity, permit easier removal when clearances are close.

**BODY**, bronze, rugged construction, straight passageway minimizes flow resistance, disc clears passageway in full open position.

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sumer package. Product quality a cutting methods, he said, will then as important to the packer as they no are to the retailer.

The main trouble with self-servi meats, in the opinion of James Cook general manager, Penn Fruit Co., Phi adelphia, arises from too much initi success and too little technical know how. A consumer survey, last sprin placed the principal complaints i three categories:

1. Merchandise was not fresh or di not appear fresh. 2. Excessive wast both apparent and concealed. 3. Types thickness and size of cuts were no satisfactory.

### Need Production Aid

Self-serviced fresh meat problems he said, basically involve cost and quality. Both can be solved by planning and production know-how. Most merchants, however, have not yet acquired the training, personnel, or equipment for production. The retailer is still primarily a salesman.

There is no doubt, Mr. Cooke continued, that if we earn the confidence of the consumer, self-service provides the means for mass selling of meats on a scale impossible in service. It is the only method of doing really big volume in the few concentrated peak hours characteristic of super market retailing. Meat is mass produced and mass processed, he went on, but when it comes to merchandising it is still largely sold on a small-scale, personalized basis. The retailer is paying wages comparable with industry but is still handling meats in a costly and primitive way. Self-service permits the mass selling necessary to match the mass production of the meat packing industry. Production knowledge is the answer. The merchant needs technical help, Mr. Cooke said, and the packer is ideally equipped to help him. It is to the packers' self-interest to bring the meat merchant up to date on production.

### Top Officers Continue

John F. Krey, who is president of Krey Packing Co., St. Louis, was reelected chairman of the board of directors, and Wesley Hardenbergh was again elected president. The following vice-chairmen of the board were also re-elected: F. W. Hoffman, Cudahy Packing Co., Chicago; Chester G. Newcomb, Cleveland Provision Co., Cleveland; W. F. Schluderberg, Wm. Schluderberg-T. J. Kurdle Co., Baltimore; and W. R. Sinclair, Kingand & Co., Indianapolis. Newly elected vice-chairmen are R. A. Rath, Rath Packing Co., Waterloo, Iowa, and A. W. Brickman, Illinois Meat Co., Chicago.

*—End*

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## *Technical* GLYCERINE NEWS

**A UNIQUE COFFEE CONCENTRATE** is said to preserve its aroma until used, according to a recent patent. A specially prepared powdered concentrate is added to freshly ground coffee which has been impregnated with glycerine. It is claimed that the resultant concentrate can be used in small cotton bags to make coffee of full flavor. (F-17)

★ ★ ★

**REVISED GLYCEROL VISCOSITIES TABLE AVAILABLE.** A new table of the viscosities of glycerine in aqueous solution from 0 to 100 per cent, at from 0 to 100 degrees C, has been prepared by the Research Laboratories of Glycerine Producers' Association. Write for your copy. (F-18)

★ ★ ★

**CANDY MANUFACTURERS USING CERTIFIED FOOD COLORS** will find that glycerine is not only an excellent solvent and suspending agent for FD&C colors but also an effective preservative as well. Where a color solution is to be kept for any length of time, it is advisable to add 25% of glycerine by volume or 32 ounces per gallon of water. (F-19)

★ ★ ★

**GLYCERINE SECTIONS OF BEILSTEIN TRANSLATED!** Now available for the first time, an English translation of the Glycerine Sections of Beilstein's famous *Handbuch der Organischen Chemie* (4th Edition). Complete in *one* volume entitled "GLYCERINE AND SOME GLYCERINE DERIVATIVES."

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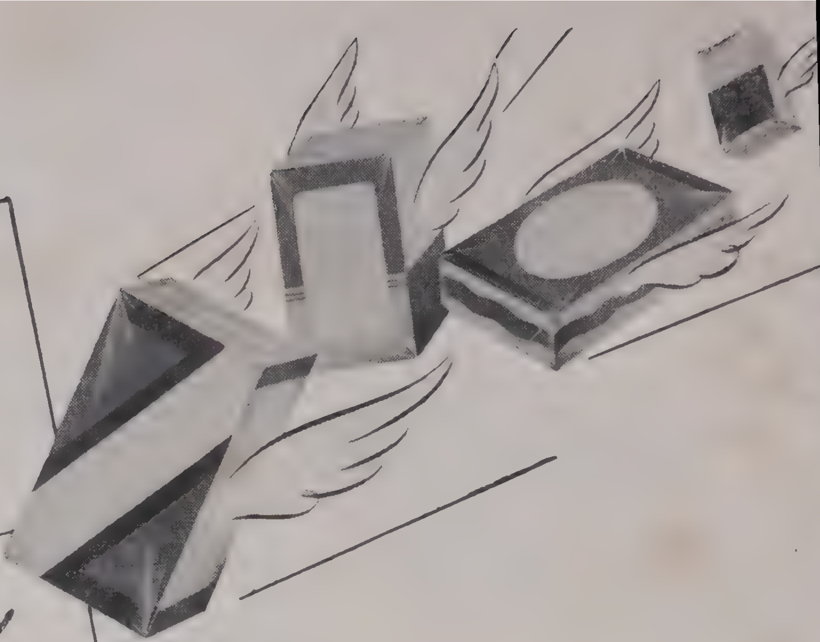

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# Food Industry News

## Investigation of Big Food Profits Gets Snarled in Hard Facts

Senator Guy Gillette's investigation of the spread between farm prices for food products and their retail prices has been making headlines, a primary purpose of the investigation.

However, the record shows—if the headlines do not—that the facts are being presented fully and completely by representatives of food processors called by the Agriculture sub-committee.

So far, the sub-committee has talked about a number of legislative proposals, none of which seems destined to get very far.

For instance, Gillette has introduced a bill that would require a minimum of 4 percent natural fats and oils in all bread and bakery products—which immediately ran into objections from bakers.

Daniel J. Uhrig, vice-president of Purity Bakeries Corp., Chicago, and R. K. Stritzinger, president of Continental Baking Co., New York City, pointed out:

1. Many breads and bakery products cannot meet consumer preferences if such a minimum fat content is required. French bread, Vienna bread, hard rolls, sponge cake, angel food cake, and pretzels are a few examples.

2. Bakers that specialize in these products would almost surely be put out of business if such legislation were passed.

3. The precedent of setting minimum fat content in consumer food products by legislation is a bad one. It could lead to similar legislation setting minimum percentages of other farm crops that happen to be in surplus.

### Dairy Profits

Senator Gillette and his colleagues on the committee were critical of the profits being made by two dairy processors, National Dairy Products Corp., and The Borden Co. The presidents of the two companies—L. A. Van Bomel, of National Dairy, and Theodore G. Montague, of Borden's—emphasized the following points:

1. Prices paid to farmers for milk are fixed by Federal milk marketing orders in most of the principal milk sheds—27 in all. Thus, the prices the companies pay for their milk is fixed for them, not by them.

2. In the case of National Dairy, net profits on sales of $980,000,000 amounted to only 2.6 cents per dollar. Profits per dollar of sales of fluid milk, have dropped from 6 percent in 1937 to 1.5 percent in 1947 and 1948. On the other hand, city, state, and federal taxes came to 4¢ per dollar of sales.

3. The farmer's share of the consumer dollar spent for milk and dairy products for the past ten years has averaged 60.22¢. In 1939, it was 50.37¢; in 1948, 63.59¢.

4. Labor costs for processing and distributing have dropped through increased volume, increased plant efficiency, and better distribution practices. While labor costs, according to the National Dairy breakdown, were 20.27 precent of the retail cost of milk and milk products in 1939, they were down to 16.27 percent in 1948—despite markedly higher labor rates. (A good portion of this saving came from every-other-day delivery of milk instead of every-day delivery.)

5. Research into new uses of dairy products has resulted in production of valuable materials out of what were formerly waste products. Casein from milk is now utilized in adhesives, plastics, paper coatings. Chemical processes have produced pharmaceuticals, medicine, baby foods, animal foods, and even chemicals for electroplating.

Montague's suggestions for narrowing the spread between farm and consumer prices are: 1. More research on distribution, particularly directed at lowering the cost of delivering fluid milk. 2. More research to devise methods of marketing milk in non-fresh form. 3. More promotion of milk consumption. 4. More work on the reduction of seasonal surpluses in high-cost areas. 5. More research on lowering the cost of producing milk.

## IFT Councilors

Dr. Carl R. Fellers, president of the Institute of Food Technologists, has announced the election of the following councilors to the Council Executive Committee: W. L. Campbell, Massachusetts Institute of Technology; B. S. Clarke, American Can Co., Chicago; H. T. Griswold, Owens-Illinois Glass Co., San Francisco; W. D. Pheteplace, Pfaudler Co., Rochester, N. Y.; Geo. F. Stewart, Iowa State College. Alternates are: R. B. Wakefield, Gerber Products Co., Fremont, Mich.; E. E. Meschter, American Preserve Co., Philadelphia.

*(Industry News Continued)*

*Wide World*

**Bet It's an "R" Month**

Of course you wouldn't know if we didn't tell you that those little things being conveyed from the boat to the upper floor of the building were oysters. Boat had just returned to its home plant at Greenport, L. I., with the first load of the new season. The bivalves descend by gravity to bins, then are prepared for market.

## Shed New Light on Bakery Mixes

**PILOT PLANT,** fully equipped for bakery experiments, takes up one whole floor.

**RESEARCH SECTION** paves way for developments on old and new mixes.

# Lab Opened by Doughnut Corp. To Study Prepared Mixes

Prepared mixes and the ingredients going into them will be studied exclusively at Doughnut Corp. of America's new $300,000 laboratory in New York City.

Five floors of scientific apparatus, various types of bakery equipment, including the company's own donut machinery, a training center for donut representatives and a miniature flour mill make up the new addition. The laboratory itself has analytical facilities, dough testing instruments and pilot scale equipment to carry out its testing functions.

Practical bakers with technical training, chemists, physicists and engineers will be employed, according to Zenas Block, the lab's director of research and development. "Laboratory observation and knowledge," he said, "must be coupled with actual production tests. Practical bakers, trained to run controlled experiments are best able to put a new ingredient, or specially processed mix, to the acid test in the pilot plant."

This central laboratory, opened in September, will work closely with the company's three blending plants, its flour mill and engineering research departments, and its egg-drying plants. These plants now turn out 138 prepared mixes and 68 doughnut mixes.

## FTC Itching to Set Discount Limits

If you have a few whopping bi customers who get whopping big pric discounts for placing their busines with you, you had better have you sales manager—and your lawyer— take a good look at a recent Federa Trade Commission action.

FTC is getting ready to use, for th first time, its authority to fix the maximum quantity of a product upon which a seller may give his maximum quantity discount.

The proposed rule would apply now only to tires and tubes. But independent food wholesalers and retailers are almost certain to ask for such a rule on food products, if and when FTC makes its tire ruling stick. Independent grocers have urged the Commission frequently during recent years to do something about the big price benefits offered to some of their heavy buyers by food processors. (See A&P story, page 150.)

### Volume Limit

Here is what FTC is proposing: It would say that a carload of 20,000 lb. is the maximum quantity of tires and tubes upon which differentials in price, because of quantity, may be granted. It means that the buyer of 2 or 5 or 50 carloads gets the same quantity discount—and no more—as the buyer of a single carload. While FTC labels this a "draft rule", there is no doubt that, having gone this far, the Commission will eventually make it official.

This is the first time FTC has used this authority, although the agency has had it ever since the Robinson-Patman Act was passed in 1936. Announcement of the ruling touched off immediate reactions. Tire industry executives indicated they would fight the action through the courts, if necessary.

FTC's maximum-quantity-for-discount rule is another milestone for the small-business lobbyists. Their antichain store agitation during the depression '30's helped obtain the Robinson-Patman Act, designed to give the small buyer a better price break as against the big-buying retailers and chains. Grocers and food retailers had a big hand in this.

FTC's authority to deal with quantity discounts got a big boost from the Supreme Court decision in the Morton Salt Co. case, last year. FTC had issued an order banning Morton from selling its table salt to some wholesalers at prices different from those charged other competing wholesalers. In its original order, FTC provided, however, that its order "shall not prevent differences of 5c. per case, which do not tend to lessen, injure, or destroy competition among such wholesalers."

The court, knocked out this proviso and told FTC it was the expert—and that either it should permit the 5c. differential if it did not injure competition, or not permit it if it did.

As a result, FTC's order, as it now stands, puts a flat ban on Morton's making any price differential between competing wholesalers.

Morton, the FTC case revealed, had given a price of $1.35 per case to five customers who bought over 50,000 cases per year—whereas less-than-carload buyers paid $1.60, and carload buyers $1.50.

## High-Powered Committee Frames GMA Meeting

Austin S. Igleheart, president of General Foods Corp., has accepted appointment as chairman of the program committee for the 41st annual meeting of Grocery Manufacturers of America, Inc., it is announced by Paul S. Willis, GMA president. The meeting will be held at the Waldorf-Astoria Hotel, New York City, November 14 to 16.

H. Russell Burbank, president of Rockwood & Co., is vice-chairman of the committee. Other members are: M. Lee Marshall, chairman of the board, Continental Baking Co.; George Coppers, president of National Biscuit Co.; Victor T. Norton, president of American Home Foods, Inc.: Robert Smallwood, president of Thomas J. Lipton, Inc.; John T. Menzies, president of The Crosse & Blackwell Co.: William A. Dolan, president of Wilbert Products Co.: Talbot O. Freeman, vice-president of Pepsi Cola Co.; Frank W. Plowman, vice-president of Scott Paper Co.; John N. Curlett, vice-president of McCormick & Co.; and Hector Lazo, director of public relations for Sunshine Biscuits, Inc.

## Best Foods Enlarging Its Dallas Plant

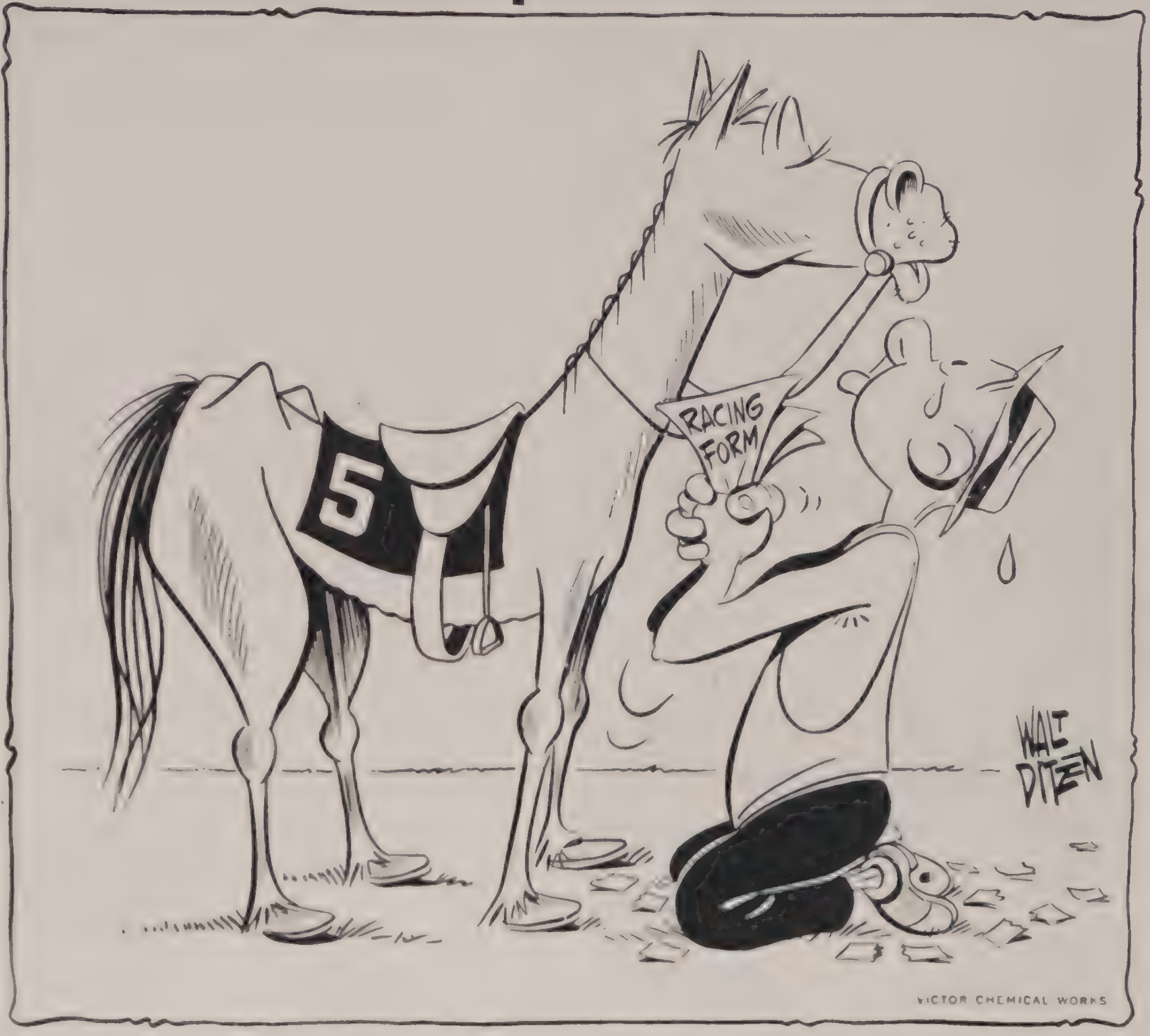
Facilities of the Dallas plant of Best Foods, manufacturer of margarine and mayonnaise, will be increased by a five-story addition for deodorizing and hydrogenating oils, G. C. Spitzmiller said recently.

At present, all the oil used in producing margarine and mayonnaise is refined in Chicago. Cottonseed oil is shipped from Texas to Chicago and then back to Dallas.

The hydrogen plant is almost completed and will be used as a source of supply for the necessary gas.

(Industry News Continued)

EVERYONE WANTS INFORMATION



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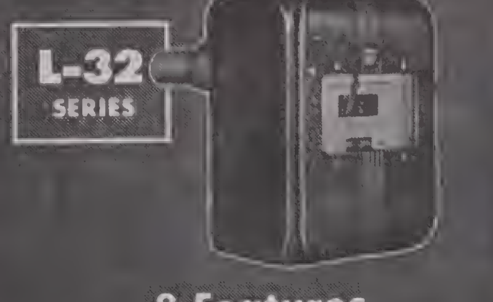

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## Clinton and Libby Add To Citrus Output

Clinton Industries and Libby, McNeill & Libby recently fortified their positions in the citrus concentrate battle now forming in Florida. Clinton, through Snow Crop Marketers, took over the plant and eleven groves of the William P. McDonald Corp. at Auburndale. Total payments for properties and fruit was stated to be $3,200,000.

Libby has signed a contract with Purpura Bros., Inc., Ocala, Fla., for the entire output of frozen concentrates produced at the latter's packing plant. This marks a new phase in the operations of Purpura, and the necessary equipment is now being installed. Cost is estimated at between $250,000 and $500,000.

## Modernization Revealed In Annual Statement

Net dollar sales of American Molasses Co. and its subsidiaries, for the year ending June 30, declined slightly from the year before—$28,345,807 against $30,635,902, although net income increased from $294,211 to $327,030. Expenditures of $418,633 for capital additions and improvements were also revealed in the company's annual statement. A complete automatic canning plant has been installed at the Wilmington, N. C., plant to accommodate increased distribution of molasses through that plant "at relatively lower cost." Additional facilities for more economic handling of ra materials were also installed at th Chicago plant. Other improvement and additions were also made at th Chicago and Brooklyn, N. Y. plants

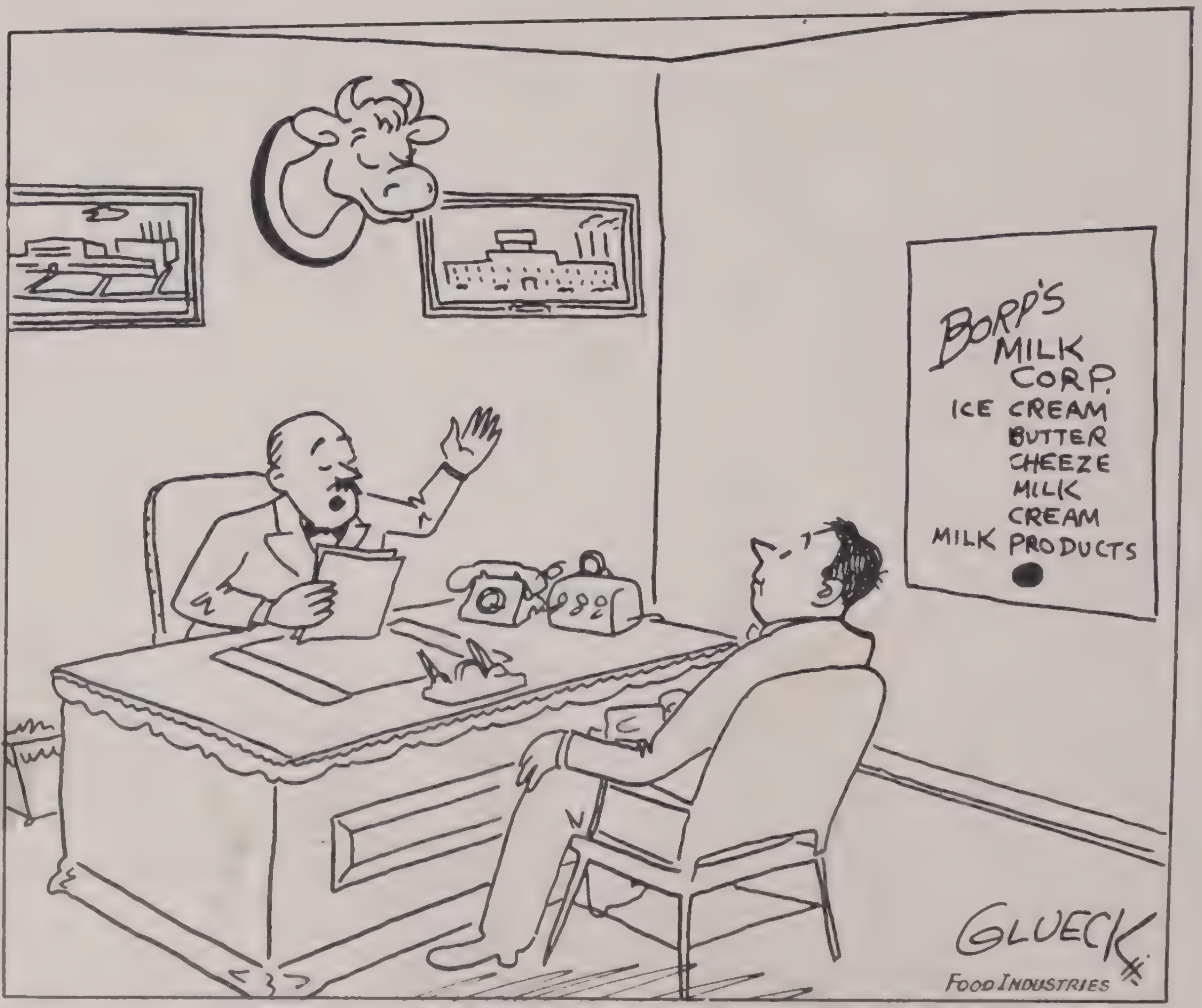
Quaker Oats Co.'s net sales and income both declined for the year ende June 30. Sales came to $207,037,483, as compared with $235,478,696 for the previous year. Net income was $8,173,642, as against $8,437,138 the year before.

Armour and Co. showed a slightly improved financial position in its interim statement for the 39 weeks ending July 31. The company's second quarter statement had indicated a loss of $6,512,634. Third quarter operations showed a profit of $170,579, cutting the 39 weeks' loss to $6,342,055. The company again points out that results for only part of the year are not necessarily indicative of the results on an annual basis.

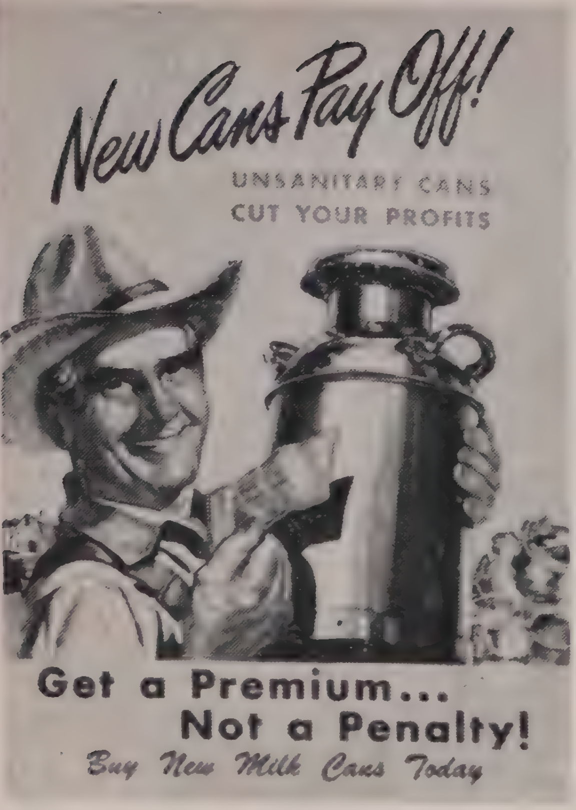
## Anti-Trusters Get Set For Food Battle

The antitrust spotlight has been on Congress all spring and summer. Basing point legislation, the anti-merger bill, and Representative Celler's monopoly investigating committee have been making the headlines.

But the filing of the Department of Justice suit against the Great Atlantic & Pacific Tea Co. caps the antitrust



"THAT'S THE ORIGINAL COW I STARTED ON, SON—"


New Cans Pay Off!
UNSANITARY CANS
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Buy New Milk Cans Today

**Milk Quality Promoted**

Distribution of posters like this is among the steps being taken by leading dairy groups to improve quality standards in the production of milk and cream. Designed by such organizations as the American Butter Institute, the posters are for display on trucks and at various prominent locations where they will gain the dairy farmer's attention.

---

actions. Actions in Federal courts in a dozen cities throughout the country this fall and winter are going to have an important impact on the food industry, and a score of other industries.

Besides A&P, other food industry cases in the works include those against the Maryland and Virginia milk producers; two cases against Chicago dairies on price-fixing and rebates; the American Can Co., and the Big Four meat packers.

Since the anti-trust chief, Herbert Bergson, took over the job in June, his 300 lawyers have been loosed on the biggest game he can find.

Bergson takes particular pride in the cases he has filed against A&P, the meat packers, Western Electric-American Telephone & Telegraph Co., and the DuPont-General Motors-U. S. Rubber group.

Each of these is directed at splitting up big companies.

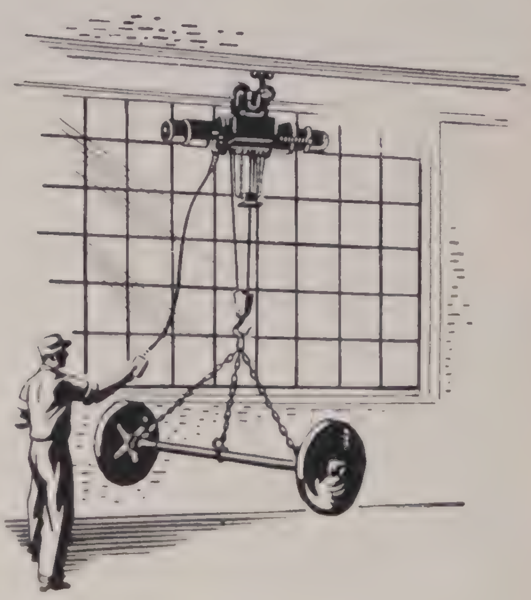
The present suit against A&P is the direct result of a Sherman Act criminal case against the company which the Department of Justice filed back in 1944. A&P lost the decision in the Federal District Court, and appealed to the Circuit Court of Appeals, which upheld the lower court.

The Circuit Court decision was handed down in February of this year by Judge Sherman Minton, who was

(Industry News Continued)

THEY LIFT THE SAME LOAD
BUT THEIR RUNNING COSTS DIFFER—

On the floor control, with the operator primarily occupied with other duties.



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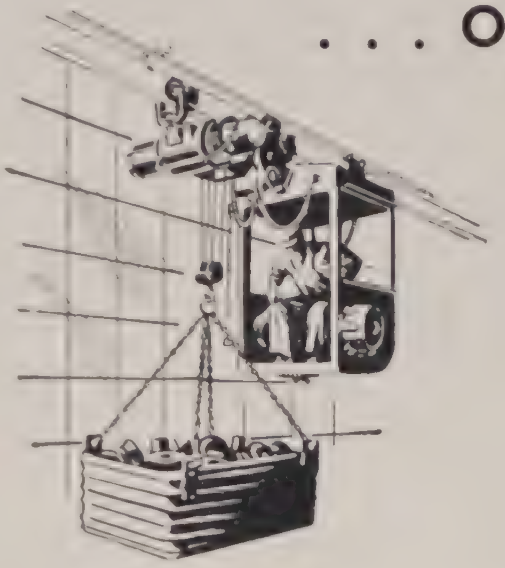

The operator in the cab, traveling loads at speeds up to 500 f.p.m. or more and occupying a better vantage point for spotting or stacking.

It's not always easy to forecast which type of service will best fill the bill.

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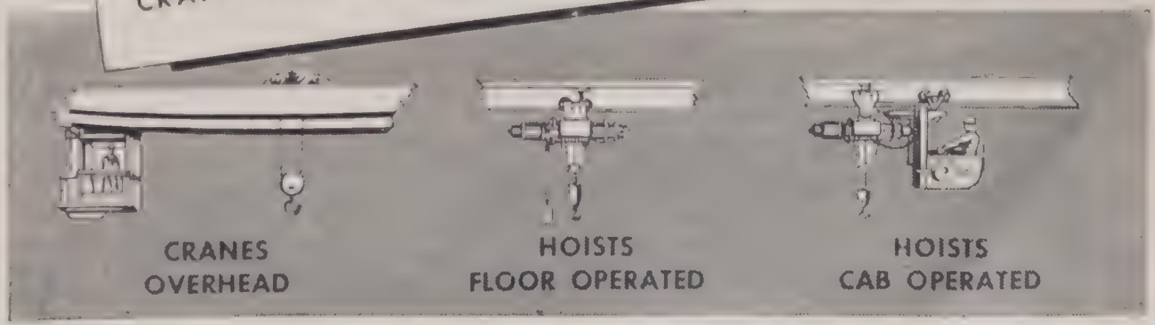

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Where food products are packaged in paper bags—from 1 lb. to 25 lb. size—the closure should be firm, tight, eye-appealing, inexpensive and easy to open. The ideal closure is the Union Special *"Dubl-Tape"* Closure. Producing this closure is the final step in mechanized packaging and can best be done with the Union Special 60000 D sewing head. Mounted on the popular Style 21800 N portable, table-type, bag closing machine, this is considered *essential equipment* by many producers of dry foods. Style 21800 N machine includes a power-driven conveyor adjustable vertically to accommodate different sizes of bags. Control is by floor treadle and the unit may be operated from a sitting position. Ask for recommendations on your particular problems. Literature on request. UNION SPECIAL MACHINE CO., 450 N. Franklin St., Chicago, Ill.

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Cheese Festival
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THERE'S A CHEESE FOR EVERY TASTE!

**Cheese Festival Aids Sales**

American Dairy Assn. is spearheading the nationwide promotion of cheese products through October and November. This point-of-sale display is one of several designed by ADA and distributed to retailers throughout the country.

later appointed by President Truman to the Supreme Court.

Following this decision in the criminal case, A&P paid $175,000 in fines instead of taking an appeal to the Supreme Court.

Now, the anti-trusters are making this victory the basis for a civil suit that asks the courts to split off A&P's food manufacturing and processing plants; to dissolve A&P's Atlantic Commission Co.; and to split up A&P's 6,000 retail stores into seven independent chains.

The charges in the earlier case were: That A&P coerced suppliers into giving discriminatory discounts and allowances; that its produce brokerage subsidiary, the Atlantic Commission Co., also gave A&P an unfair competitive advantage; that in general, A&P through abuse of its large buying power succeeded in establishing a two-price level in the food industry—a lower price for A&P, a higher price for its competitors.

All this, the Department of Justice contends, adds up to a conspiracy to restrain trade and to suppress and eliminate competition.

A&P immediately denied that it had broken any law. It claimed that the Department of Justice was attacking bigness as such—and predicted that if the government won its case, it would be a severe blow at the manufacturing and distribution systems of scores of vertical companies.

The case will be a long time coming to a final decision. A&P has announced that it will fight this case to the finish.

The Great Atlantic & Pacific Tea Co., including its subsidiaries, is the largest single food retailer in the country. Its retail sales in 1947 amounted to $1,900,000,000, which was 6.4 percent of the total retail sales of the country's 600,000 food stores that year.

## A. E. Staley Building New Soybean Plant

A. E. Staley Mfg. Co., Decatur, Ill., has started construction of a new soybean oil solvent extraction plant as part of a program for modernizing its processing facilities. The building is to be completed next July.

An addition will also be built on the preparation building where soybeans are made ready to go through the extraction process. The underground storage for hexane, which is used to extract oil from the flaked beans, also will be expanded.

The new plant, which will have a rated daily capacity of 800 tons of soybeans, will be adjacent to the first plant, which has a rated capacity of 500 tons. It is estimated that the cost will be more than the $2,500,000 spent on the first soybean solvent extraction plant completed four years ago.

Operation of the company's Expeller plant will be continued for as long as possible, according to A. E. Staley, Jr. Conversion of the company's entire soybean processing operations to the solvent extraction method will not increase the plant's over-all capacity, but will make it possible for Staley to discontinue use of a less efficient process.

## Shaffer Named Chairman Of NCA Convention

Irvin C. Shaffer, Just Born, Inc., New York City, will serve as general chairman of the National Confectioners' Association's 67th annual convention to be held in New York, June 4 to 9. Charles R. Adelson, Delson Candy Co., New York, will act as program chairman.

Convention sessions will be held at the Waldorf-Astoria and the Exposition will be on the first floor of Grand Central Palace.

National Confectioners' conventions in 1951 and 1952 will be held in Chicago at the Stevens Hotel with a return to New York planned for 1953.

## Brewery Regulations

Amendments to Internal Revenue Regulation 18 covering brewery operations have been proposed, to enable the bottling of beer before tax payment. This will be done by extending the official brewery premises to include the brewery bottling house, in accordance with the provisions of Public Law 261 of the 81st Congress, approved Aug. 23.

The proposed amendment was printed on pages 5928 to 5937 of the Sept. 29 *Federal Register.* A period of 30 days was provided for written comments to be filed with the Commissioner of Internal Revenue. Mar. 1, 1950 was set as the effective date.

## DISTRIBUTION

### Canned Vegetable Exports Dropped During 1948

United States exports of processed vegetables and vegetable products during 1948 declined sharply from the all-time high reached in 1947, the Office of International Trade, U. S. Department of Commerce, recently reported. Dollar value of commercial exports of these food products in 1948 was $25,600,000, while in 1947 it was $39,600,000.

Foreign import restrictions and increased food supplies in foreign countries were principally responsible for the decline last year, according to a report in OIT's "World Trade in Commodities" series.

The principal groups of commodities covered in the category of processed vegetables and vegetable products are canned vegetables, vegetable juices, and soups. Commercial exports (excluding relief and Army shipments) of this group totalled 86,000,000 lb. in 1948.- This is about the equivalent of 2,850,000 cases, based on 24 No. 2 cans per case. In 1947, commercial exports reached approximately 200,000,000 lb., the equivalent of 6,600,000 cases.

In spite of this decline, commercial exports of canned vegetables, juices, and soups in 1948 were higher than for any comparable war or prewar period. They were about double the average annual exports during the period 1934-38.

U. S. production of canned vege-

(Industry News Continued)

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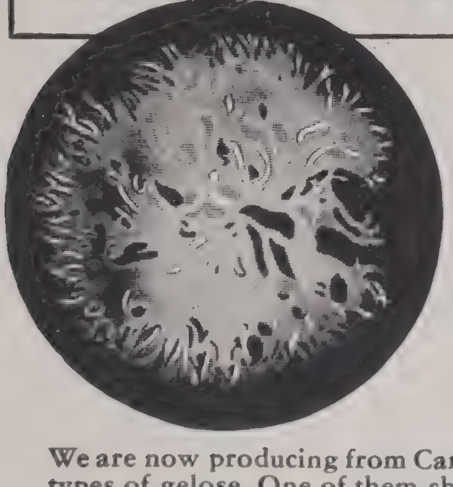

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Send for free liberal working samples for experimental use.

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Wide World

## Just Plain Bean Soup

In order to make a first hand study of how bean soup is prepared in the Senate restaurant—says the caption on this picture—Marie Wilson of the movies paid a visit to the Capitol and helped prepare a batch. It also says that what she is emitting is a scream. Caption writers!

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tables and products is now about half again as large as that of the immediate prewar period, the report says. Peak output was reached during the first postwar canning season, 1946-47, when the total pack was about four-fifths greater than the average during the 5-year period 1934-38.

The OIT report points out that the proportion of total domestic production of canned vegetables and products which is exported has never been large. During the prewar years exports took about 1 percent of total domestic production, while in the 1947-48 season they took about 2.3 percent.

## End of Hawaiian Strike Good Union Strategy

Sudden settlement of the Hawaiian longshoremen's strike may have caught the general public by surprise, but leaders within the industry looked upon it as a strategic union retreat in the face of developments.

At the strike's outset, last May 1, Harry Bridges' International Longshoremen's & Warehousemen's Union (CIO) halted all shipping from the Islands. Shipping to Pacific Coast ports was particularly under ILWU domination; longshoremen on the Coast refused to handle any cargo from Hawaii.

However, under an emergency law, the Territorial government manned

Hawaiian docks, loading ships destined for Gulf and East Coast ports where they would be unloaded by longshoremen not under the jurisdiction of the leftwing union. Revival of shipping relieved critically congested storage conditions and provided capital to ease the credit position of the sugar, pineapple and fishing industries.

### Sugar Difficulties

In addition to the dock strike in the Islands, California & Hawaiian Sugar Refining Corp., San Francisco, had to cope with a strike at its Crockett, Calif., refinery. This strike began on Sept. 1, following C and H's announcement that its plant would suspend operations September 3 because its stock of raw sugar would then be exhausted and because of the uncertainty of reaching a contract renewal agreement with the ILWU mainland unions.

Their mainland refinery now completely strikebound, Hawaiian raw sugar producers continued to accumulate huge stocks of raw sugar in Island storage. In September, their stocks reached 475,000 tons—about 40 percent of the Islands' total yearly production—valued at about $57,500,000. In addition to this amount, Hawaiian sugar producers expected to make 150,000 tons more before this season's campaign closed. For economic reasons, as well as the lack of further storage space, at least part of this production had to be marketed before the coming 1950 campaign.

Taking advantage of the new shipping lifeline, and of Federal reappor-

*(Industry News Continued)*

*Wide World*

**Pineapple Riot**

Unloading of fruit, from the then-strikebound Hawaii, reached the violent stage in late September, when CIO longshoremen attacked AFL truckdrivers at The Dalles, Ore., port. Some trucks were damaged and cases thrown in river before outbreak was quelled.

**$3.19 Air Express cost helped this wildcatter strike it rich!**

**When a pump valve** goes while drilling for oil, it's costly. Idle men and equipment make profits evaporate. It happened to a wildcatter at 4 P.M. Phoned 800 miles away for parts—delivered 11 P.M. that night by Air Express. 12 lbs. cost only $3.19. (*Regular* use of Air Express keeps *any* business moving.)

**$3.19** was *complete* cost. Air Express charges include speedy pick-up and delivery service. Receipt for shipment, too. Makes the *world's fastest* shipping service exceptionally convenient.

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**Facts on low Air Express rates**

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6-lb. carton of vacuum tubes goes 900 miles for $2.10.
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**Only Air Express gives you all these advantages:** Special pick-up and delivery at no extra cost. You get a receipt for every shipment and delivery is proved by signature of consignee. One-carrier responsibility. Assured protection, too—valuation coverage up to $50 without extra charge. Practically no limitation on size or weight. For fast shipping action, phone Air Express Division, Railway Express Agency. And specify "Air Express delivery" on orders.

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COCONU

Good-to-look-at can also say, "Good to eat!"

Mounds and Almond Joy — the famous 10¢ candy bars made by Peter Paul, Inc. — are quality products. Made to exacting standards, they are then packaged with equal care. The appearance of the well-designed wrappers contributes to appetite appeal. It is then important that the wrapped candies reach the dealer and the consumer in perfect condition. The shipping cases in which Mounds and Almond Joy are packed are sealed and fully protected by Arabol Adhesives.

"We have found Arabol Adhesives eminently satisfactory for this purpose, for more than 15 years", say Peter Paul, Inc., Naugatuck, Connecticut.

Arabol is proud to serve Peter Paul, Inc. — proud to serve the leaders in a hundred other industries. Born of 64 years of pioneering, it is our aim to supply each user with the one specific Arabol Adhesive best suited to each of his particular requirements. On this basis, Arabol Adhesives are now used for more than a thousand different applications. See the Arabol Representative when he calls; he knows adhesives.

**THE ARABOL MANUFACTURING CO.**

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*Adhesives?...* ARABOL!

tionment of sugar quotas, E. B. Wilso president of C and H, announced tha his company had firm commitments t ship 200,000 tons of raw sugar t Eastern refiners before Dec. 31, an an additional 200,000 tons befor June 1, 1950. With no tie-up by Gulf East Coast labor groups, this left th company some 225,000 tons with whic to begin operations when the strik ended.

### Cane's Loss, Beet's Gain?

Earlier this year, western beet sugar manufacturers organized the Western Beet Sugar Producers' Assn., and provided it with a budget of $3,000,000 for its initial three years' operation. This association was organized to persuade consumers to use more beet sugar. In 1947, 70 percent of western beet sugar went to industrial users and 30 percent to consumers. The association aims at least to equalize this distribution.

By the end of September there was still cane sugar to be found on western retailers' shelves, although it was reported that wholesale supplies of consumer-size packages of granulated sugar were running low. An overly long continuation of these ILWU strikes could have the effect of providing the Western Beet Sugar Producers' Assn. with a temporary but nevertheless ready-made retail market in which, due to lack of competition, they could make considerable progress.

## Candy Charges Snafued, FTC Drops Action

The Federal Trade Commission last year filed sweeping complaints against 34 candy manufacturers, charging violation of the Robinson-Patman Act ban on discrimination in prices and in facilities and services offered their customers, and on granting brokerage payments to direct buyers.

Now, FTC has washed out its wholesale attack on the companies' pricing practices. Reason: FTC, in reviewing objections filed by the candy makers, found its original complaints so confused and mixed-up that it tossed them out.

The FTC brought up its case against the New England Confectionery Co. first—and then applied this decision to the others.

This does not mean that FTC won't attack the candy companies again. But if it does, FTC will spell out the complaint in more clear-cut fashion.

Specific reason for FTC's unusual withdrawal of charges in so important a case is: The complaint made a particular pricing practice the basis for charging the companies with violation three or four different sections of e price-discrimination act. Each of ese sections provides different meth-s by which a company can prove at the practice was not illegal.

For instance, the defense against a arge of price discrimination is a owing that the lower price was justi-ed by cost savings in making large olume sales.

The defense against discriminatory ranting of facilities or services is hat they were offered to all customers n proportionally equal terms.

On the other hand, there is no de-ense against making brokerage pay-nents to direct buyers—except to prove that no brokerage payments vere made.

Also, FTC ruled that many of the practices that it earlier charged were llegal are actually not questionable at all. Among these practices: Giving a discount when the manufacturer eliminates customary packing, selling, or delivery services to the customer; giving free deals, premiums, etc., to help make the original sales; or furnishing a customer with candy packaged in special-size containers, containers marked with the customer's name, or supplying products in different shapes and sizes.

The complaint against the 34 companies grew out of the pending case against the Automatic Canteen Co., which was charged with inducing suppliers to discriminate in its favor. In the course of hearings on this complaint, candy suppliers filed price and other information involved in their dealings with Automatic Canteen Co.

*(Industry News Continued)*

Wide World

**Bubble Ballistics**

As director of research for the Bazooka Bubble Gum Co., New York City, Dr. Morris Nafash has to test the texture and elasticity of the product as well as develop new and improved flavors. He thinks bubbles are about as big as they are going to get, because "the kid's face gets in the way." Dr. Nafash is from Brooklyn.

CHISHOLM-MOORE HOIST CORP. TONAWANDA, N.Y. U.S.A.
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LIGHT as a
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# CYCLONE

96% Efficient
42% Fewer Parts
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HERC-ALLOY Flexible Load Chain

Picture this: a high speed chain hoist that weighs only 35 lbs. for the 1 ton capacity model. No more struggling with slow, ponderous, outmoded hoists. The Cyclone can be carried around with ease. Lifts loads rapidly with an easier pull on the chain. Can take the rough handling of maintenance crews or the continuous duty of production application. Workmen are grateful . . . do their work faster, safer and better when they have a Cyclone.

**AVAILABLE IN capacities from ¼ to 10 ton.**
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**HOIST CORPORATION**
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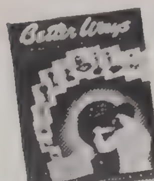
Master control panel—where time, torque, speed, pressure and vacuum are all read on automatic recording instruments, controlled by photo-electric circuit actuated by the scale.

A new method of testing centrifugal pumps—measuring the volume and time of water flow *by weight with TOLEDOS*—now provides *greater accuracy* in data on pump performance at the Allis-Chalmers plant in West Allis, Wisconsin. Also, time required for the tests is materially reduced.

These Toledos are used in conjunction with an electronic timing device—which provides automatic control of the test, including recording of data. This reduces the possibility of human error and speeds up test work. This method also makes possible the use of Toledo photo-electric controls which "read" the scale and take the test points automatically. Now, measuring by weight proves far more accurate than any former method.

*Control your costs and quality* with TOLEDO all the way . . . in weighing, counting, force-measuring, batching or testing . . . and to provide the vitally important ACCOUNTING facts on receiving, shipping and production.



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**TOLEDO**

**HEADQUARTERS FOR SCALES**

FTC attorneys then used this inform tion as the basis for the charge agai the 34 candy makers.

While FTC is still free to revise a sharpen up its cases against the canc producers, industry sources are hop ful that it may not be done. The cand industry at its Chicago convention la June held a conference with FTC off cials aimed at drawing up fair trad practice rules. The drafting of pr posed rules is in the works at FTC which is expected to announce the this fall.

The rules would cover the practice that caused the formal complaint b FTC. If acceptable rules are finally adopted, FTC may hold off furthe action, at least until it has had an opportunity to examine the industry's conformance with them.

## PROCESSING

### USDA Grade Standards

Several commodities have been covered by U. S. Department of Agriculture grade standards since they were last reviewed in FOOD INDUSTRIES. Among them were the following:

*Carcass beef* standards for the official U. S. Commercial grades may soon be divided into two new grades designated "Regular" and "Commercial", for better coverage of young cattle. Specifications for these two grades were outlined on page 4984 of the Aug. 12 *Federal Register*. Originally only 15 days were provided for submission of written comments to the Director of Livestock Branch, Production and Marketing Administration. A subsequent order, published in the Sept. 17 *Federal Register,* extended this period to Nov. 1.

*Carcass beef* specifications for Prime, Choice, Good, Commercial, Utility, Cutter, and Canner grades were promulgated in rewritten form on page 5519 of the Sept. 8 *Federal Register*. Effective date was set as Oct. 8. This action was based on the proposed amendment, published on July 13, to eliminate color of fat as a factor in these grades.

Inspection requirements for grading and certification of *meats, prepared meats,* and *meat products* were formally adopted by an order published on page 5133 of the Aug. 18 *Federal Register*. (FOOD INDUSTRIES, Sept. 1949, page 128). Sept. 17 was set as the effective date.

*Poultry* and *domestic rabbits* may soon be covered by new rules governing grading and inspection. Also included in the proposed order, printed on page 5626 of the Sept. 14 *Federal*

*Register,* were proposed U. S. specifications for classes, standards, and grades, superseding the following tentative standards currently in effect: Tentative U. S. standards for classes and grades for *live poultry,* effective July 15, 1944; *dressed chickens,* July 7, 1943; *eviscerated, federally inspected chickens,* July 1, 1944; *dressed turkeys,* Nov. 6, 1942; *eviscerated, federally inspected turkeys,* Nov. 20, 1944; *dressed domestic rabbits,* April 1932; and tentative U. S. standards for grades for *dressed ducks, geese, guinea fowl,* and *squabs,* effective Jan. 19, 1943. Oct. 14 was set as the date by which written comments should be received in the Poultry Branch, PMA.

*Fresh tomatoes* may be covered by new U. S. standards, superseding the standards currently in effect. The proposed amendments were printed on page 5826 of the Sept. 24 *Federal Register.* Thirty days were provided for written comments to be filed with Fruit and Vegetable Branch, PMA. The standards are proposed to become effective during Nov. 1949.

*Fresh carrots* may be covered by new U. S. consumer standards. The proposed specifications were printed on page 5836 of the Sept. 24 *Federal Register.* Thirty days were provided for filing written comments with the Fruit & Vegetable Branch, PMA.

*Grapefruit* and *oranges* will probably be covered by new U. S. standards, superseding the standards currently in effect. The proposed amendments were printed on pages 5937 and

*(Industry News Continued)*

*Wide World*

**County Crop's Good**

Los Angeles County claims top rung among the nation's 3,072 counties in the value of crops produced—$227,000,000. But the lady is nothing so hackneyed as a "queen." She rated the title "Princess of Vegetables" at the county fair last month.

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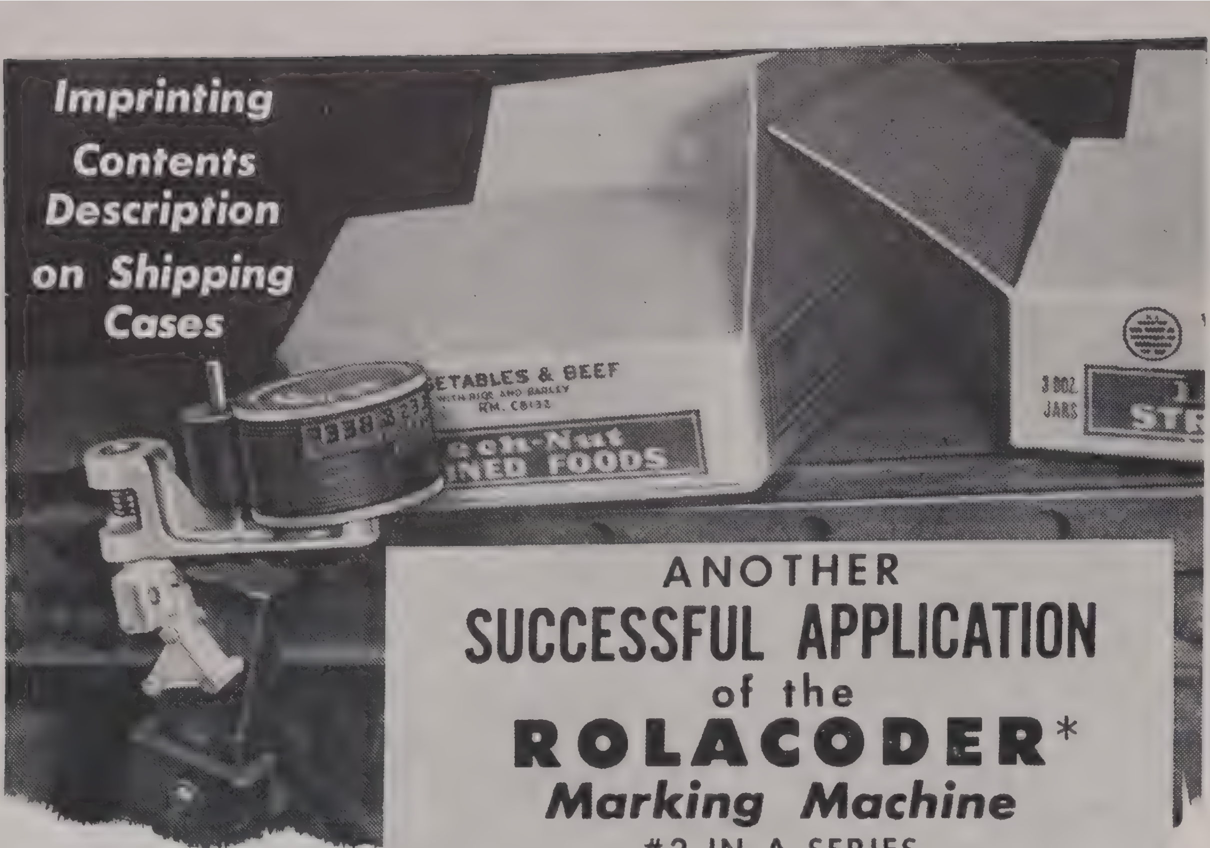

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for the new ideas
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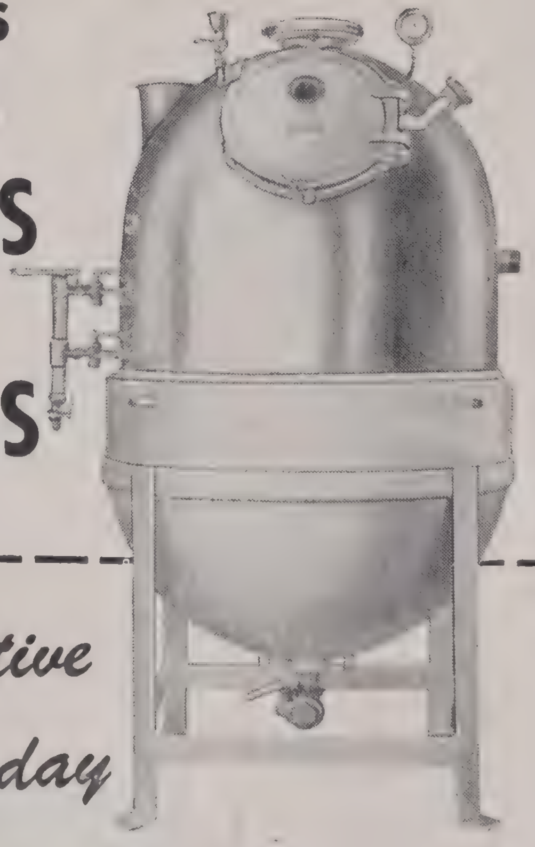

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5940 of the Sept. 29 *Federal Regis* Thirty days were provided for fi written comments with Fruit & Ve table Branch, PMA. The standa were proposed to become effective d ing Nov. 1949.

## W. V. Cruess Develops Frozen Apple Juice

A frozen apple concentrate th makes a fresh apple juice drink mixing with water has been develop by Dr. W. V. Cruess, University California food technologist.

The concentrate can be sold in ca and distributed through grocery store A cold, fresh apple drink is made simply mixing three cans of water wi one of the concentrate.

The new drink can be manufacture according to the California's College Agriculture, by clarifying and filterin apple juice, then concentrating it a vacuum pan to about 65 percen sugar content. Fresh apple juice then added to improve flavor until th sugar content is brought down to abou 45 percent. The blend is put in can quick frozen, and is ready for sal

## F&DA Food Standards

Tolerances for poisons or deleteriou residues on or in fresh fruits and vegetables will be the subject of a very important Food & Drug Administration hearing beginning on Jan. 17 before Presiding Officer Bernard D Levinson. Although the hearing is primarily to discuss fresh fruits and vegetables, basic data submitted will be of vital concern to processors. Subsequent hearings for canned, dried, and frozen foods will be largely based on the precedents established at this January hearing, which will probably be a fairly long one. The announcement, on page 5724 of the Sept. 17 *Federal Register,* outlined the scope of action contemplated.

*Canned pineapple* and *canned pineapple juice* standards will not be discussed in 1949, as originally scheduled. More data will be collected, both by Puerto Rican and Hawaiian canners, and the hearing will begin on Oct. 16, 1950, according to the Sept. 28 *Federal Register* announcement.

The *bread* hearing has adjourned. A discussion of this proceeding will be found on page 78.

Tentative orders are awaited in four proceedings: *Salad dressings, frozen fruit, canned corn,* and *canned mushrooms.*

(Industry News Continued)

# JAMISON-BUILT DOORS

# help Schaefer make better beer

Modern breweries demand the finest in equipment to assure the uniformly high quality of their product.

That is why Jamison-built cold storage doors were selected by The F. & M. Schaefer Brewing Company of Brooklyn, New York for the refrigerated rooms in the brewing process. For nearly 50 years, Jamison has been the leading builder of cold storage doors. This has been due largely to consistently building doors of rugged, durable design that meet the requirements of refrigeration users.

The standard line of Jamison cold storage doors will meet the majority of user requirements for temperature, dimensions, application. Special door requirements can be built to specifications.

*For full information and specifications, request Catalog 175.*

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• IN FOOD PROCESSING

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Because assured customer satisfaction for your seasoned or flavored food product can be achieved easily with Spiceolate (water-solublized) flavors, Essential Oils or Oleo Resins.

In addition to manufacturing a superior food product you also gain production economies resulting from lower handling and storage costs.

*Satisfy yourself — Satisfy your customers — Consult D & O.*

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Final order on standards of ident for *cheeses* is the next official step that proceeding. Comments on tentative order were due to be filed Oct. 4.

*Ice cream* standards may be d cussed at a hearing early in 19 Present expectation is that the resid tolerances hearing will be well unde way before an ice cream hearing a nouncement is made.

## Schedule of Events

### November

8–9—American Butter Institute, 41st a nual meeting; Drake Hotel, Chicago.
13–17—Vegetable Growers Assn. of Americ 41st annual convention; Claypo Hotel, Indianapolis.
14–16—Grocery Manufacturers of Americ 41st annual meeting; Waldorf-Astori New York City.
14–17—American Bottlers of Carbonated Beverages, 31st national convention an exposition; Convention Hall, Detroit
14–18—Refrigeration Equipment Manufacturers Assn., 6th all-industry refrigeration and air conditioning exposition Auditorium, Atlantic City.
16–18—Texas Technological College, dairy manufacturing short course; Department of Dairy Manufacture, Lubbock, Tex.
28–Dec. 3—Chemical Industries, 22nd annual exposition; Grand Central Palace, New York City.
29–30—Purdue University, 5th industrial waste conference; Lafayette, Ind.

### December

5–10—Pennsylvania State College, ice cream short course for dairy equipment and supply men; School of Agriculture, State College, Pa.

### January, 1950

22–31—Joint conventions and expositions;
  22–27—National Food Brokers Assn.,
  28–31—National Canners Assn.
  28–31—Canning Machinery and Supplies Assn. Auditorium, Atlantic City.
23–24—Canadian Food Processors Assn., annual convention; Ritz-Carlton Hotel, Montreal.
23–Feb. 4—Pennsylvania State College, short ice cream course for plant men; School of Agriculture, State College, Pa.
26–27—National Dairy Council, annual meeting-winter conference; LaSalle Hotel, Chicago.
26–28—Refrigeration Research Foundation, annual meeting; Edgewater Beach Hotel, Chicago.
27—National Pickle Packers Assn., midwinter meeting; Roosevelt Hotel, New York City.
28–31—National-American Wholesale Grocers Assn., annual convention; Ambassador Hotel, Atlantic City, N. J.
30–Feb. 2—American Warehousemen's Assn., 59th annual meeting; Edgewater Beach Hotel, Chicago.
31–Feb. 4—National Assn. of Frozen Food Packers and National Preservers Assn., all-industry convention; Congress Hotel, Chicago. —*End*

*jams . . . jellies . . . preserves . . .*

# Look Better Taste Delicious

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# Citric or Tartaric Acid

Pfizer Citric or Tartaric Acids balance the sweetness of sugar and add a mouth-watering zest to jellies, jams and preserves that makes these delicacies hard to resist.

The ready solubility of Pfizer Acidulants will help you speed production—and their high quality and purity guarantee uniform acidulation from batch to batch.

Pfizer Citric and Tartaric Acids are available as the U.S.P. products. But Citric Acid is also available as the Anhydrous Acid—identical in purity with the U.S.P. but containing no water of crystallization. Write today for further information and prices. Chas. Pfizer & Co., Inc., 630 Flushing Avenue, Brooklyn 6, N. Y.; 425 North Michigan Avenue, Chicago 11, Ill.; 605 Third Street, San Francisco 7, Calif.

## Other Pfizer Products for the Food Industry

**SODIUM CITRATE U.S.P.**

a buffer for the control of pH, an emulsifier for cheeses and to prevent feathering of cream.

**CALCIUM CITRATE U.S.P.**

firms pectin in tomatoes and apples, and is used in the preparation of alginated jellies.

**CREAM OF TARTAR**

for the prevention of crystallization of sugars by partial inversion.

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## BETTER! SAFER! QUICKER! AT LESS COST!

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- Dairy Equipment
- Food Processing Equipment
- Woodwork
- Walls
- Floors
- Windows
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**BECAUSE NYTRON** has an exclusive combination of properties never before available in any single detergent, it offers many advantages over ordinary cleaning materials. Not an alkali, not a soap, and not a mixture . . . this patented wetting agent-detergent is ideal for regular maintenance cleaning—daily, semi-weekly or weekly. Economical to use, too, because only a small quantity is required to obtain effective results.

**MULTIPLE DETERGENT ACTION** enable NYTRON to clean thoroughly with remarkabl ease. This completely new general maintenanc cleaner can be used with power scrubbing equipment and, since it will not harm the hands in an concentration, it may be safely used for all han cleaning operations. For special cleaning jobs requiring stronger detergent action, NYTRON ca be used with acids or alkalies, including caustic

## SPECIAL FEATURES

### EXCEPTIONAL DETERGENCY

Because NYTRON'S detergent action includes wetting, penetration and emulsification, it is effective on a wide variety of soils. NYTRON is safe for washing high-gloss painted surfaces, yet may be used for regular maintenance cleaning of garage floors.

### FREE RINSING

NYTRON will rinse thoroughly and quickly—*even in cold or hard water*—without streaking or spotting. It leaves no film or deposit to harbor bacteria. Unlike ordinary soap, alkaline or abrasive cleaners, NYTRON leaves no gummy or greasy film, no gritty residues, no white deposits.

### HIGH AND RAPID SOLUBILITY

NYTRON is highly soluble and goes into solutions rapidly at either high or low temperatures . . . an important feature in the initial preparation of the solution, and in the rinsing operation.

### EXCELLENT EMULSIFYING POWER

Easily removes oil, fat and grease from surfaces, metal parts, fabrics.

### EXTREMELY MILD

NYTRON is non-toxic and harmless to normal skin.

### NYTRON WILL NOT DULL THE FINISH OF PAINTED SURFACES

It is safe for cleaning any finish that will not be harmed by clear water.

### COUNTERACTS HARD WATER DIFFICULTIES

Works well under extreme hard water conditions; NYTRON'S positive detergency and superior rinsability are not diminished by increases in water hardness.

**NYTRON** is available for immediate delivery from any of the Solvay offices listed below. Detailed literature describing the uses and advantages of NYTRON for general maintenance cleaning is also available. Write or call the Solvay office nearest you—today!

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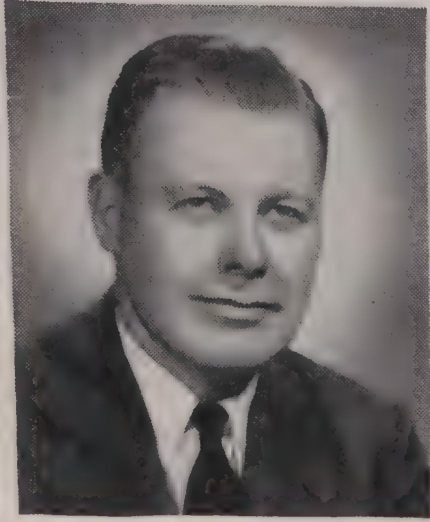
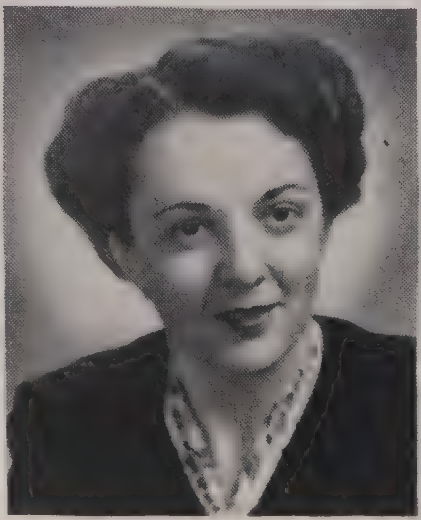
A SOLVAY PRODUCT

# Men, Jobs, Companies

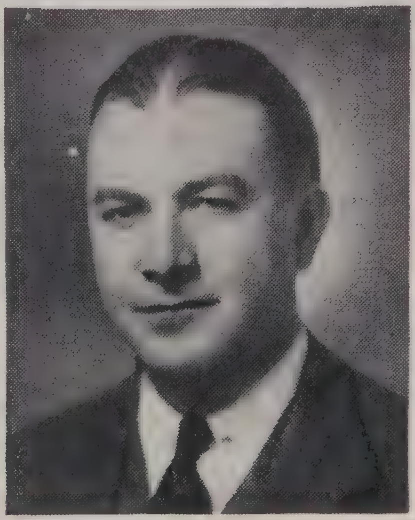
**WALLACE KENNEDY,** former production v.-p. of Thomas J. Lipton, Inc., has been elected to the board. He joined firm in 1943 as assistant general manager of Continental Foods. Previously he was with Borden's. (Fabian Bachrach photo).



**W. R. GRAHAM, JR.,** former vice-president of Cerophyl Laboratories, Kansas City, Mo., recently became director of research for Quaker Oats Co., Chicago. He will supervise chemical, pharmaceutical and nutritional research activities.



**BARBARA HUTCHINGS** is the new home economics director of John H. Dulany & Son, Inc., Fruitland, Md. A Drexel Institute graduate, she was formerly food technologist for National Association of Frozen Food Packers, Washington, D. C.



**WARREN N. BURDING** has been appointed president of John F. Jelke Co., Chicago, subsidiary of Lever Bros. Co. He comes to the margarine making firm from Standard Brands, Inc., where he had been associated since 1928 in various sales positions.

## Industry

**Bobrose Products Co.**, Jacksonville, Fla., plans to expand production facilities for the manufacture of its Tallahassee ''Hush Puppies''. Automatic mixing and packaging equipment will be installed.

**Burny Bros.**, Chicago, is constructing a new baking plant to replace its present unit. Completion date is set for 1950. Structure will be one-story 125,000,000 sq. ft. area, of brick and concrete.

**Canada Dry** carbonated bottling plants are now under construction at Rimouski, Quebec, and Windsor, Ontario.

**Carnation Milk Co.'s** new $2,000,000 nine-story building on Wilshire Blvd., Los Angeles, was recently formally dedicated. This location will serve as firm's world headquarters.

**Candymakers, Inc.**, Philadelphia, manufacturer of Barbara Waldon chocolates, has been purchased by Max Leon and Morris Soble. The reorganized firm temporarily will trade under the name Leso.

**Central State Bottlers, Inc.**, Clare, Mich., has been incorporated for $50,000 by R. D. Otterbine of Mt. Pleasant, Mich.

**Florida Citrus Co-Operative** is enlarging production facilities at its Lake Wales plant. Frozen citrus concentrate output is expected to be doubled.

**Franklin Foods, Inc.**, has been formed in Franklin, Mich., to manufacture and distribute toasted and seasoned nuts.

**Glidden Co.** announces formation of a New England division to operate under the name of Durkee-McCadam Co. Headquarters and warehouse will be located in Cambridge, Mass.

**Hamilton Provision Co.**, Cincinnati, has been formed to cure, smoke and deal in meat products.

**Hirsch Bros. Co.**, Louisville, has purchased building, acreage, machinery and inventory of the Klein Pickle Co., Cleveland.

**Kellogg Co.**, Battle Creek, Mich., has started production in its new $1,000,000 Gro-Pup dog food plant.

**Louisiana Coca-Cola Bottling Co., Ltd.**, New Orleans, recently opened its new $1,000,000 bottling plant. It is three-story structure covering two city blocks.

**Manitoba Sugar Co., Ltd.**, Winnipeg, Man., Canada, announces appointments of B. C. Neuman, G. E. Neuman, and R. Abras as directors, and of Norman L. Leach and H. Tooley as vice-presidents.

**Michigan Sugar Co.** operated its Lansing, Mich., plant for the 1949 beet sugar season. Plant had been shut down since 1942.

**Molson's Brewery, Ltd.**, Montreal, Canada, reports construction of a new brewhouse, to be completed in spring of 1951. It will have a capacity double that of existing facilities.

**McGough Bakeries Corp.**, Birmingham, Ala., is enlarging and modernizing its plant at an estimated $300,000 cost.

**National Fruit Products Co.** of Winchester, Va., is operating, under lease, the cannery of Virginia Canfoods, Inc., Timberville, Va.

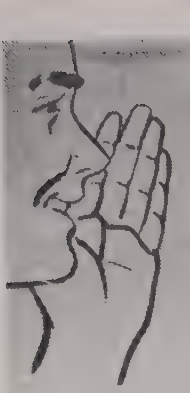
**National Molasses Co.**, Orland, Pa., reports plans for construction of an $80,000 plant at Albany, N. Y.

**National Macaroni Manufacturers Assn.** will hold its second annual Pacific Coast Conference Oct. 23-25 at the St. Francis Hotel, San Francisco.

**Original Allegretti, Inc.**, has resumed candy production in a new air conditioned plant in Chicago. H. F. Eggert, long-time president of the firm, came out of retirement to head the concern, which was founded during the Columbian Exposition.

**Pure Milk & Dairy Co.**, Tiffin, Ohio, has sold its business and plant name to Beatrice Foods Co., Chicago.

*(Men, Jobs, Companies Continued)*

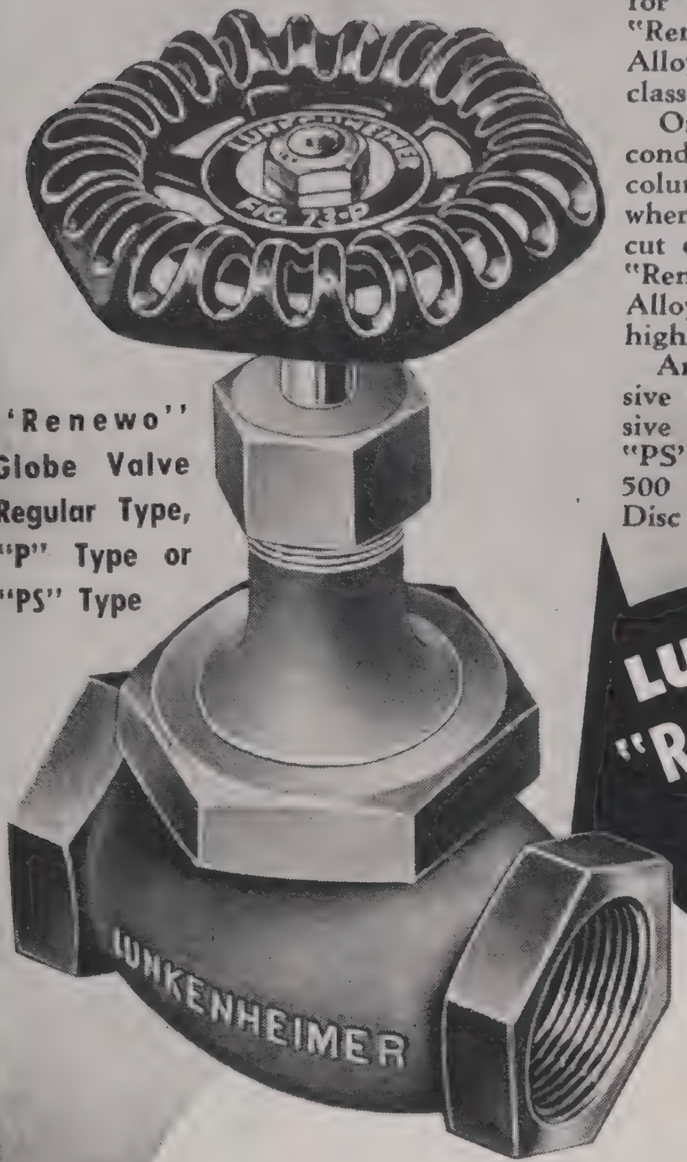


Here's a Tip...
for selecting the RIGHT VALVE
for the RIGHT PLACE

If you just want an extra good valve for general service, then choose the "Renewo" with Regular Type Nickel Alloy Seat and Disc. It's tops in its class.

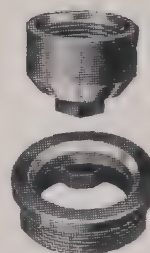
Or, perhaps you have a throttling condition such as drain, drip, water column blow-down and like service where regular seats and discs tend to cut out... use the "P" (Plug Type) "Renewo" with 330 Brinell "NS 5" Alloy Seat and Disc. Here you have high resistance to wear and corrosion.

And for severe throttling and erosive service, particularly where abrasive conditions are present . . . the "PS" (Plug Type) "Renewo" with 500 Brinell Stainless Steel Seat and Disc will solve the problem.

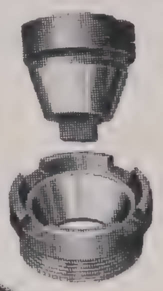


"Renewo" Globe Valve Regular Type, "P" Type or "PS" Type

LUNKENHEIMER "RENEWO" VALVE Threesome



1. REGULAR TYPE "Renewo" Nickel Alloy Seat and Disc for general service.



2. "P" (PLUGTYPE) "Renewo" "NS5" Nickel Alloy 330 Brinell Seat and Disc for throttling, drain, drip, water column blow-down and like service.

3. "PS" (PLUG TYPE) "Renewo" Stainless Steel 500 Brinell Seat and Disc for close throttling and other severe erosive service.

*and look at these money saving extra features*

1. Each type of seat and disc is interchangeable one with another, making it possible to convert a regular type valve into a plug type without taking the valve out of the line.

2. Available in 200 lb. S.P. as well as 300 lb. S.P. making it unnecessary to purchase a 300 lb. valve for 200 lb. service.

*The "Renewo" Threesome is fully described in Circular No. 577. A copy is yours for the asking . . . from your Lunkenheimer Distributor or direct from us.*

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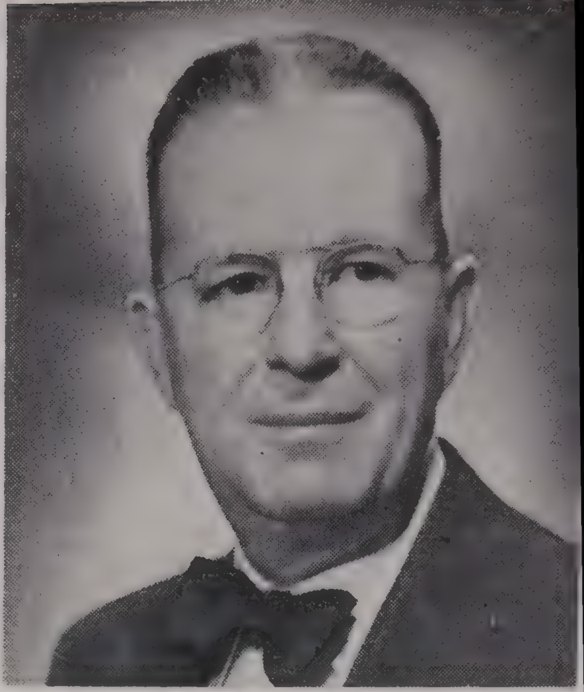

**DR. ROBERT R. FULTON**, former director of research kitchen and new products development section of Armour & Company, Chicago, has been appointed food technologist with Magnus, Mabee & Reynard, Inc., New York and Chicago essential oil house.

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**Purpura Bros., Inc.**, Ocala, Fla., is launching a $500,000 plant expansion program after signing a contract with Libby, McNeill & Libby for the entire output of its frozen orange concentrate. Evaporators now being installed will permit production up to 10,000,000 6-oz. cans a season.

**Ready-To-Bake Foods, Inc.**, of Los Angeles, announces opening of a new plant in Plymouth, Wis., to manufacture refrigerated biscuits for the Borden Co.

**Seven Up Bottling Co.** and True Ade Bottling Co. of Charlotte, N. C., have merged to operate under name Charlotte Seven Up Bottling Co.

## Personnel

**Elmer B. Boyd**, president of Home News Publishing Co., New Brunswick, N. J., has been elected v.-p. of Flako Products Corp., also in New Brunswick. He fills a vacancy created by death of William H. Sheffield.

**Eugene P. Farrell**, former production manager of Maney Milling Co., Omaha, has been named milling technologist at Kansas State College, Manhattan. He will head mill modernization program in addition to teaching classes in milling technology and practice.

**Dr. William F. Hester**, previously director of insecticide and fungicide research with Rohm & Haas Co., Philadelphia, has been named administra-

*(Men, Jobs, Companies Continued)*

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**JOHN F. KREY,** president of Krey Packing Co., St. Louis, was re-elected chairman of board of directors of American Meat Institute at its 44th annual meeting. Wesley Hardenbergh, of Chicago, was re-elected president.

tor of the Koppers' Co., Inc. fellowships at Mellon Institute, Pittsburgh.

**C. E. Maier** has been made general manager of research with Continental Can Co., Chicago, to succeed A. L. Manone, who retires Dec. 31.

**P. E. Paulson** has been appointed vice-president and managing director of Refrigerated Foods Engineering, Ltd., Toronto, Canada.

**D. S. Pribyl,** former manager of engineering at H. J. Heinz Co.'s Berkeley factory, has been promoted to manager of the firm's Tracy, Calif., plant.

**B. L. Prince** has become manager of the Spartanburg, S. C., plant of Armour & Company. He replaces O. T. Hendrix, who has been transferred to the firm's Greensboro, N. C., plant.

## Associated Industry

**Atlas Mineral Products Co.,** Mertztown, Pa., has appointed A. Myles Younger vice-president in charge of sales.

**American Blower Corp.,** Detroit, has completed negotiations for a new manufacturing and assembly plant at San Leandro, Calif.

**Chain Belt Co.,** Milwaukee, announces opening of a modern warehouse in conjunction with expanded facilities at Dallas.

*(Men, Jobs, Companies Continued)*

# Getting down to cold facts

**PRODUCT:** Soft drink dispenser cold plate.

**COOLING COIL:** ELECTRUNITE Stainless Steel Tubing...Type 304; Size 1/4"; Gauge 20.

**COIL FABRICATOR:** Steel and Tubes Division.

**FABRICATING TOLERANCES:** Between fittings —.005".

**REMARKS:** Your inquiries for fabricated assemblies receive expert attention of experienced personnel.

Well known to the food and beverage industries are the advantages of ELECTRUNITE Stainless Steel Tubing . . . *cleanliness* . . . *sanitation* . . . *long service life* . . . because it is made of Republic ENDURO Stainless Steel.

In this application, the fabrication story is both unusual and interesting. Because the finished coil is cast in a solid metal plate, which fits into the bottom of the fountain dispenser, absolute alignment of fittings and coil is a must requirement. Quite frankly, this was not a simple job —even for Steel and Tubes' experienced fabricating men. Only after painstaking work with jigs, bending tools and spot welding cycles, were they able to overcome all of the problems involved.

All of which adds up to one very important point: whether you require plain straight tubing, in carbon or stainless steels, or fabricated tubular assemblies of any description, it pays to come *first* to the leader of the welded steel tubing industry . . . Steel and Tubes. For prompt help with *any* tubing problem, write, wire or phone:

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Here is yet another satisfied Stokes and Smith customer. Like hundreds of others using S & S equipment, Theobald Industries have found that it pays to have the *best* in production machinery.

NEVERSTOP automatically feeds the cartons . . . bottom seals . . . fills . . . then seals the carton tops. *There is no stopping!* After the cartons are fed into the machine, they move in a smooth never-ending line, rapidly to completion and packing. NEVERSTOP is built in 3 models and will fill up to 160 or more units per minute.

For nearly 50 years, Stokes and Smith have been recognized as builders of "Better Machines for Better Packaging". If your products require wrapping, sealing, or filling in bags, boxes, cartons, bottles or cans, there is an S & S machine to do it swiftly, neatly and accurately.

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**Enterprise Engine & Foundry Co.**, San Francisco, announces appointment of John H. Sheusner as chief Engineer.

**Fibreboard Products, Inc.** reports that B. P. Altick, formerly general manager of Federal Container Co., Philadelphia, a wholly-owned Fibreboard subsidiary, is returning to San Francisco Dec. 1 to become assistant to the general manager.

**First Machinery Corp.**, New York City, has formed a profit sharing corporation, called Equipment Clearing House, Inc. It will be composed of stockholders who were former employees of the firm.

**Robert Gair Co., Inc.**, New York, has appointed T. Rasmussen & Co., Ltd., London, England, as exclusive sales representatives for Europe and British Isles.

**Link-Belt Co.** announces opening of a district sales office in Duluth, Minn.

**National Starch Products, Inc.**, has changed the name of its Canadian affiliate from Meredith, Simmons to National Adhesives (Canada) Ltd.

**Safety Car Heating & Lighting Co., Inc.** has named Robert B. Dodds as vice-president in charge of the Entoleter Division.

## Deaths

**A. Joseph Freschi**, 72, president and co-founder of the Ravarino & Freschi Macaroni Co.—September, of a heart ailment, in St. Louis.

**Edward J. Marum**, 56, vice-president and sales manager of Wm. J. Stange Co., Chicago—Sept. 10, of a heart attack.

**Frank S. Munns**, vice-president and treasurer of Munns Brothers, Inc., meat packing firm of Lexington, Ky. —Sept.

**Carl W. Skogsberg**, 55, president and founder of the Colonial Baking Co., Oklahoma City—Sept. 9 of pneumonia.

**Webster W. Witt**, 64, retired president and founder of Williams, West & Witt, Gary, Ind., concentrated food manufacturer—Sept. 14, in Sawyer, Mich.

*—End*

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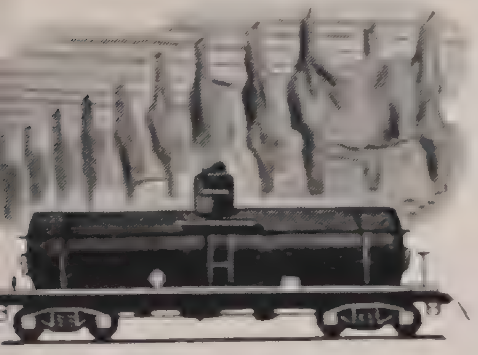

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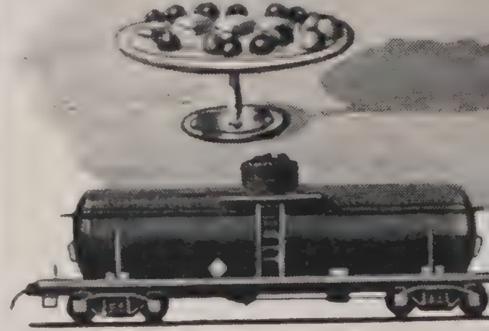
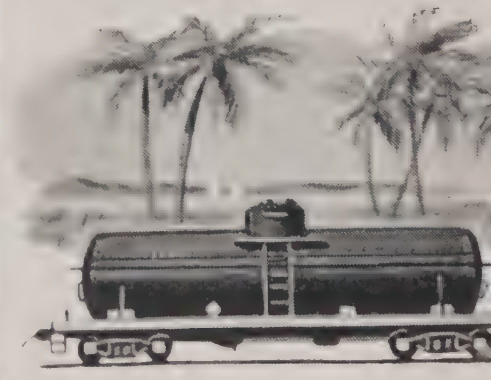
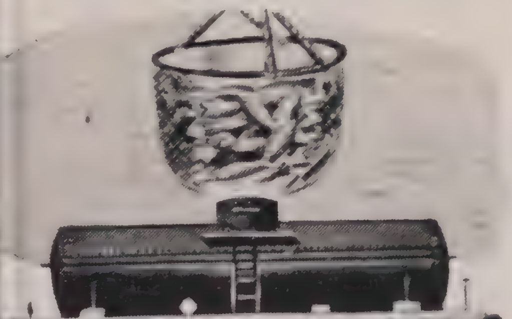


CORN SYRUP UNMIXED



COCONUT OIL



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# *Perfect Batches*

## WITH NEPTUNE METERS

Ten non-automatic Trident meters in this New York candy plant measure both corn syrup and liquid sugar the easy way—right into the kettles.

Precision metering of all liquid sugars, corn syrups or other sweeteners and water entering your kettles, mixers and beaters assures uniform product quality, saves ingredients and handling time formerly wasted through weighing, measuring pails, or stick gauging. There's never any mess because the liquids stay inside the pipes.

Batches can be made semi-automatic with Trident Auto-Stop meters. Just set the meter for the amount you want, open the valve, and walk away. The Auto-Stop shuts off the flow when the exact amount is delivered. It eliminates human errors and gives formula-perfect batches. For each liquid, one meter can serve a battery of kettles with a valve and header hook-up, or you can save more time by putting a meter at each kettle.

Non-Auto-Stop meters are also available for all liquid sweeteners and water. Put meters also at key control points and take the guesswork out of inventory records. Neptune meters, built for long life with sustained accuracy, measure by volume or in terms of weight, and record totals.

Battery of candy kettles are accurately batched by Auto-Stop syrup and water meters. This Milwaukee plant also uses Auto-Stop at marshmallow beater.

Bulletin 573-2 shows how you can install liquid meters in your plant to stop waste and improve quality. It's free—send for it today.

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# Books

## Data Book

REFRIGERATION FUNDAMENTALS. *Edited by B. H. Jennings. Published by The American Society of Refrigerating Engineers,* 40 *W.* 40*th St., New York* 18, *N. Y.,* 1949. 602 *pages;* 6½ *x* 9½ *in.; cloth. Price,* $7.

Basic data, fundamental principles, and practices of refrigeration are again under one cover in this new edition of the society's well known data book. This is in contrast to recent volumes published in 1940, 1943 and 1946, in which no attempt was made to cover as wide a field.

In addition to rewriting a greater part of the text, the editors and authors have added new psychrometric charts, developed for ASRE, covering an extensive range, from low to high temperatures. Tables have been expanded and for greater convenience, regrouped. Charts covering the newer refrigerants, particularly the Freon family, have also been added.

## Freezing Method

FREEZE-DRYING. *By Earl W. Flosdorf. Published by Reinhold Publishing Co.,* 330 *W.* 42*nd St., New York* 18, *N. Y.,* 1949. 280 *pages;* 6¼ *x* 9¼ *in.; cloth. Price,* $5.

With our rapid advances in all methods of freezing foods, this volume should carry a great deal of interest for those engaged in food research. It serves to bring together the most significant information on freeze-drying developed during the past ten years. It also offers hitherto unpublished general information on the subject.

Considerable space is given to the application of freeze-drying in preserving food products. But the food technologist will also be interested in much of the general discussion of basic principles.

## Biochemical Studies

ANNUAL REVIEWS OF BIOCHEMISTRY, VOL. XVIII. *Edited by J. Murray Luck, H. S. Loring, and G. Mackinney. Published by Annual Reviews, Inc., Stanford, Calif., 1949. 739 pages; 6¼x9⅛ in.; cloth. Price, $6.*

With research constantly on the increase, the selection of papers for reviews of this kind becomes more and more difficult. However, in this volume the editors still manage a representative collection.

Food research probably comes off better than most. At least ten of the papers have a bearing on work now being done or contemplated in food laboratories. These ten are:

"Biological Oxidations", by P. W. Preisler and F. E. Hunter, Jr.; "Fat Soluble Vitamins", by P. L. Harris; "Water Soluble Vitamins", by E. L. R. Stokstad and T. H. Jukes; "Nutrition", by A. Keys; "Proteolytic Enzymes", by E. L. Smith; "Nonoxidative, Nonproteolytic Enzymes", by K. Myback; "Carbohydrate Chemistry", by D. J. Bell; "Chemistry of the Lipids", by J. A. Lovern; "Chemistry of Amino Acids and Proteins", by H. P. Lundgren and W. H. Ward; and "Chemistry of Antibiotics", by O. Wintersteiner and J. D. Dutcher.

## Sugar Technology

THE MICROBIOLOGY OF SUGARS, SYRUPS AND MOLASSES. *By William L. Owen. Published by Barr-Owen Research Enterprises, P. O. Box 1345, Baton Rouge, La., 1949. 275 pages; 5¾x8¾ in.; cloth. Price, $5.*

Food chemists concerned with fermentation in the manufacture of sugar and during its use in processing, also with the deterioration of sugars, syrups and molasses, will find here a convenient and comprehensive reference. The author attempts to bring together much of the scattered information on the microbiological phase of sugar and sugar products.

## Government Publications

CANS FOR FRUITS AND VEGETABLES. *National Bureau of Standards, Simplified Practice Recommendation R*155-49. *June* 1, 1949. *Price,* 10c. A recommendation of voluntary trade practice and list of firms agreeing to follow rules for standard size, capacity, and designated use.

DELIVERY CASES FOR SQUARE GLASS MILK BOTTLES. *National Bureau of Standards, Simplified Practice Recommendation R*236-49. *April* 1, 1949. *Price,* 10c. Recommended standard dimensions and construction.

AGRICULTURAL STATISTICS, 1948. *Department of Agriculture. Price,* $1.75. A compilation of pertinent data including complete figures for most commodities and most farm activity through the calendar year 1948.

SURVEY OF TREE NUT USAGE BY INDUSTRIAL USERS. *By J. C. Genske. Pro-*

*(Books Continued)*

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Save pay-roll hours by streamlining your clean-up operations and using more effective lower-cost-per-job cleaners, detergents, and bactericides. Eliminate waste materials and unnecessary effort. A Klenzade field technician will help you plan a complete integrated program.

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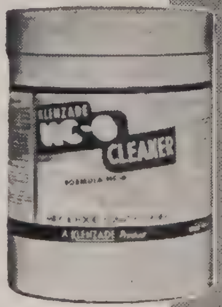

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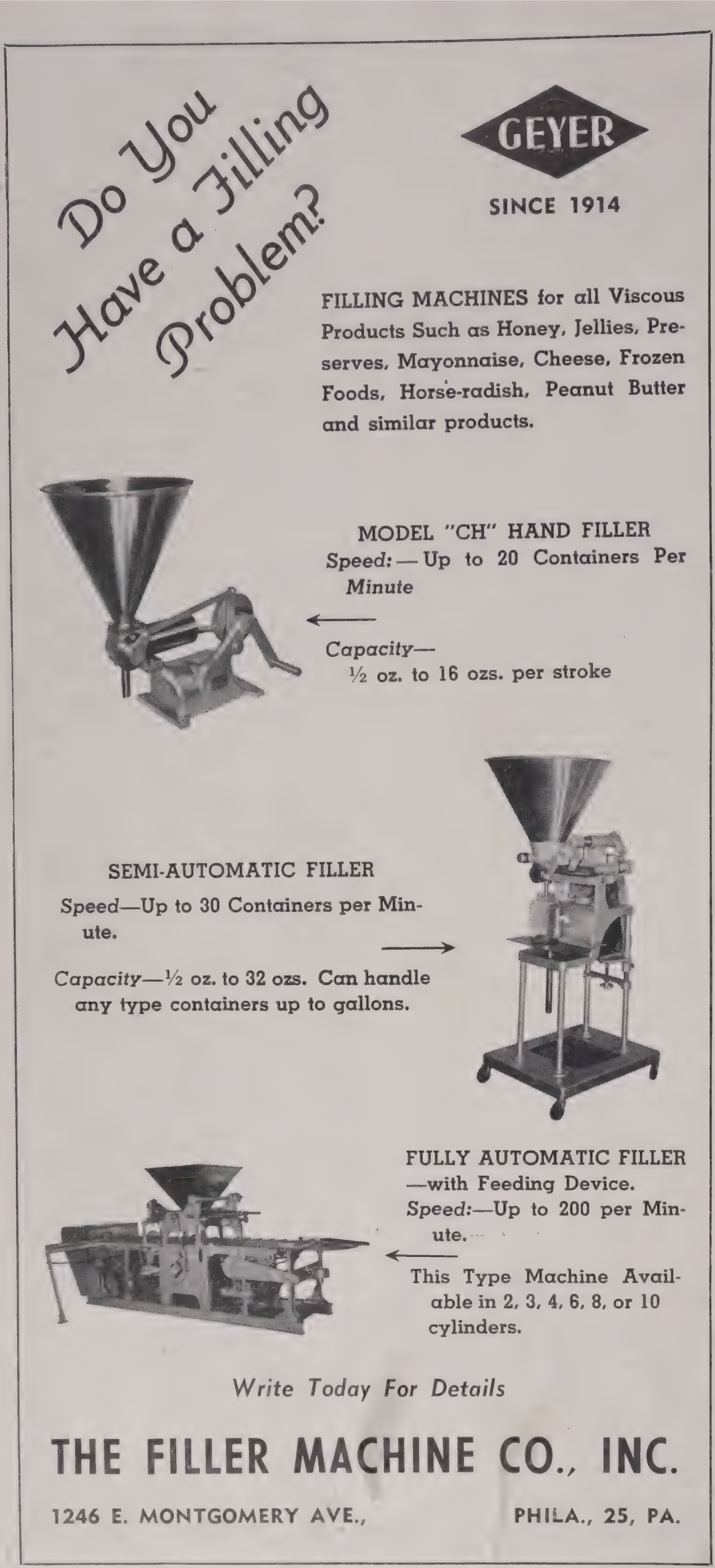
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SEMI-AUTOMATIC FILLER
Speed—Up to 30 Containers per Minute.

Capacity—½ oz. to 32 ozs. Can handle any type containers up to gallons.

FULLY AUTOMATIC FILLER —with Feeding Device.
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*duction and Marketing Administration, Department of Agriculture. Mimeographed.* An exploratory study into the factors affecting usage of tree nuts.

TENTATIVE RECOMMENDATIONS FOR THE TREATMENT OF BERRY BOXES (HALLOCKS) TO REDUCE MOLD GROWTH. *By E. J. Barta and E. Lowe. Bureau of Agricultural and Industrial Chemistry. AIC-239. June,* 1949. *Mimeographed.*

A SELECTED BIBLIOGRAPHY OF PERIODICAL LITERATURE ON FRUIT AND VEGETABLE PROCESSING WASTES. *By Otto R. Vasak and W. Lawrence Shaw. Bureau of Agricultural and Industrial Chemistry. AIC-232. Mimeographed.*

CANNING WAGE STRUCTURE, 1948. *Bureau of Labor Statistics. Series* 2, *No.* 72. *Mimeographed.* A critical analysis of the classification of workers and wages in canning plants with much statistical detail.

ECONOMIC INDICATORS. *A monthly printing of charts and data prepared by the President's Council of Economic Advisors and published by Congressional authority for industrial use. Available by subscription only. Price,* $1.75 *per yr.* Most of the data report indexes of business activity which are believed to be significant in gaging industry trends. General, not specifically related to the food business.

THE INSPECTION STAMP AS A GUIDE TO WHOLESOME MEAT. *By John R. Mohler. Bureau of Animal Industry. Miscellaneous Circular No.* 63. *Price,* 10c. Describes inspection methods and gives philosophy of sanitary control in meat packing.

THE CONCENTRATION OF PRODUCTIVE FACILITIES, 1947. *Report of the Federal Trade Commission. Total Manufacturing and 26 Selected Industries. Price 25c.* Gives for several process-industry groups information regarding the large companies and the part which they play in the total national production. Includes nine or ten chapters of importance to food technologists.

ANNUAL REPORT OF THE FOOD & DRUG ADMINISTRATION, 1948. *Federal Security Agency. Price, 20c.* Summarized activities and technical progress for the Fiscal Year 1948.

*The above recently issued documents are available, at the prices indicated, from the Superintendent of Documents, Government Printing Office, Washington 25, D. C. When no price is indicated, the pamphlet is free and should be ordered from the bureau responsible for its issue.* —End

# How some Good Old Horse Sense Can Cut Your Painting Costs

Shrewd old "hoss traders" will tell you "Never buy a horse without looking at his mouth . . . yes sir, open it up and take a good look if you want to know his worth."

*The same applies to paints.* Many a smart dollar has been saved on a painting job by using a little horse sense. You do this by comparing a can of "Barreled Sunlight" with a can of any other paint you choose. Naturally, you pay no attention to the cans or the price tags on them. What pays off is what's in those cans. You have to *open* them . . . thin the contents according to directions . . . and then test on a wall where you can actually see the difference.

Compare the two . . . for yardage, solid coverage per coat and appearance after drying. Yes, *and because labor represents eighty per cent of the cost of painting,* see which paint goes on *faster.* With a fair, true test like this, it doesn't take much mathematics to figure that "Barreled Sunlight" will give you a better looking, longer lasting paint job *for less money* than any other paint you want to name. Talk it over with our representative. He'll call at your convenience. Write.

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**U. S. GUTTA PERCHA PAINT COMPANY**
37-K Dudley Street, Providence, Rhode Island

**Barreled Sunlight *Paints***

**In whitest white or clean, clear, pleasing colors, there's a Barreled Sunlight Paint for every job**

***IT ALWAYS COSTS MORE NOT TO PAINT!***

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You can't take chances in shipping delicate, precision equipment. If such equipment is damaged in transit, your customer will probably look elsewhere the next time he places an order. Whatever your product, the H & D Package Laboratory can work out a safe, dependable, economical packaging method that will protect your goodwill . . . *and* your profits!

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Gift Package

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PLYPAK* is a corrugated packing material that combines several thicknesses of corrugated paper to form a protective "blanket" which is ideal for packaging fragile merchandise. Clean and easy to handle, PLYPAK* is simply "wrapped" around a product, gives it a soft, close-fitting cushion that defies shock. Ask for sample.

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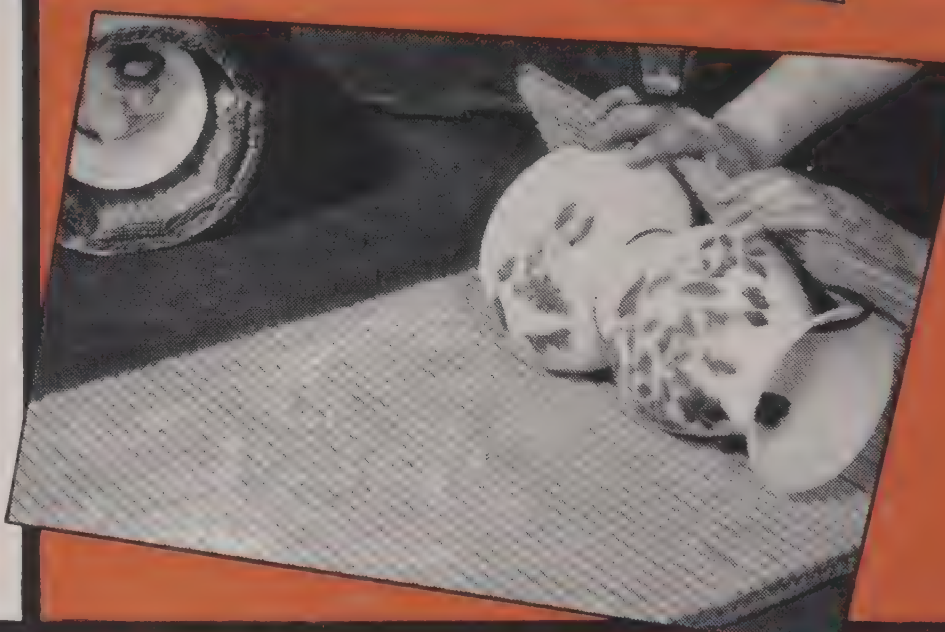

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*Authority on Packaging*

***Executive Offices: 4904 Decatur St., Sandusky, Ohio***

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# Catalogs, Bulletins

## Food Plant Equipment

### Air Blowers

Rotary, positive blowers covered in 8-page Bulletin 21-B-37, operate on pressure or suction, or both. Construction features, operating advantages, driving arrangements and recommended accessories are dealt with in booklet. —*Roots-Connersville Blower Corp., 900 W. Mount St., Connersville, Ind.*

### Cooling Tower Quiz

Latest "What's Your Cooling Tower I. Q.?" concerns testing mechanical draft towers. Information is offered in question and answer style.—*The Marley Co., Inc., Fairfax and Marley Rds., Kansas City 15, Kan.*

### Dairy Equipment

Fully automatic packaging and pasteurizing equipment for the dairy industry is featured in 30th anniversary publication. Growth, facilities, and personnel of company receive attention.—*Ex-Cell-O-Corp., 1200 Oakman Blvd., Detroit.*

### High Speed Packaging Machinery

Carton feeder and bottom sealer, net weight weighers, top sealers and closers, glue tight-wrapper, combination filler-sealer, double package maker, and heat seal tea bag machines are illustrated and described with specifications, photos and dimensional drawings in Bulletin 111.—*Pneumatic Scale Corp., Ltd., N. Quincy, Mass.*

### Air Dryer

Where products should be dried below 140 deg. F., silica gel air dryer is recommended by Datagram S.G.D. #5. Theoretical approaches to drying in batches or continuously, with method for applying information to specific problems, are presented with flow diagrams.—*Air Dryer Dept., Bryant Industrial Div., Affiliated Gas Equipment, Inc., 1020 London Rd., Cleveland 10.*

### Industrial Vacuum Cleaner

Powerful suction, easy recovery of heavy particles, and demountable motor-fan unit to enable conversion to electric blower are among advantages reported for Tornado portable industrial vacuum cleaners detailed in 4-page folder.—*Breuer Electric Mfg. Co., 5100 Ravenswood Ave., Chicago 40.*

### Opposed Impeller Pumps

Balanced axial thrust because of opposed impellers is important design feature in two- and four-stage pumps described and illustrated in 12-page Catalog 1550.—*De Laval Steam Turbine Co., Trenton 2, N. J.*

### Motor "Takes" Submersion

Under conditions of dust, dirt, moisture or even total submersion, compact hermetically sealed motor keeps running, says Data Sheet 18. Suggested applications are for pumps, dairy equipment and other food machinery.—*Piqua Machine & Mfg. Co., Piqua, Ohio.*

### Air Filters

Water, oil, and particles ranging in size from visible to microscopic may be removed from air, gases, or light liquids by filters discussed in 4-page folder.—*Allen Industrial Filter Co., 25 S. St. Clair St., Toledo, Ohio.*

### Dairy Supplies and Equipment

Besides 15 tips on preventing waste in dairy plants, house organ, *Dairy Drummer*, Vol. 8, No. 3, contains illustrations and specifications for equipment and supplies used in the dairy industry.—*The Creamery Package Mfg. Co., 1243 W. Washington Blvd., Chicago 7.*

### Centrifugal Pumps

Single-stage, double suction centrifugal pumps are illustrated and described with specifications in 24-page book. Sections on construction features, tables of friction loss for water in ft./100 ft. pipe, and head-capacity for 60 cycle motor speeds, as well as basic information and examples on figuring pumping heads are included.—*Allis-Chalmers Mfg. Co., S. 70 St., Milwaukee.*

### Low Pressure Refrigeration

Single-acting compressors of 2, 3, 4 or 6 cylinders with valves in safety heads, force-feed lubrication, heads removable without disturbing pipe lines and dual control are among features of low pressure refrigerating unit detailed in Bulletin 791-A—*Frick Co., Waynesboro, Pa.*

### Small Icing Machine

Automatic icing of up to 120 pieces per min. for any shape sweet goods is reported accomplished by apparatus described in Model S50/135 Bulletin. Features of apparatus include thermostatically controlled hot water jacket, automatic heads and semi-automatic disks and brushes made to requested specifications, sanitary valves, roomy storage compartment.—*Basic Foods Sales Corp., Machinery Div., 599-603 Eleventh Ave., New York City 19.*

### Cellulose Seal Shrinker

Caps or bands of cellulose used on bottles or jars are dried and hardened in 30 sec. by infrared equipment detailed in information sheet. Specifications, suggested uses, and construction details are listed.—*The Miskella Infra-Red Co., E. 73 St. & Grand Ave., Cleveland 4.*

### Industrial and Laboratory Filters

How filters operate, information on stone and wire mesh membranes, and details of construction of filters that feature a backwashing system for ease of cleaning are covered in 12-page booklet—*Titeflex, Inc., 695 Frelinghuysen Ave., Newark 5, N. J.*

## Materials Handling

### Lateral Bend Power Conveyor

Newly patented power-driven belt conveyors take any width belt, and turn at any desired degree, reports 4-page folder.—*Latendorf Conveying Corp., 55-61 Oak St., Bayonne, N. J.*

### Forged Steel Casters

Principles of construction of forged steel casters for extra heavy, heavy and regular duty with semi-steel, plastic, or rubber-tired wheels are covered in Bulletin 60.—*Hamilton Caster & Mfg. Co., 1688 Dixie Highway, Hamilton, Ohio.*

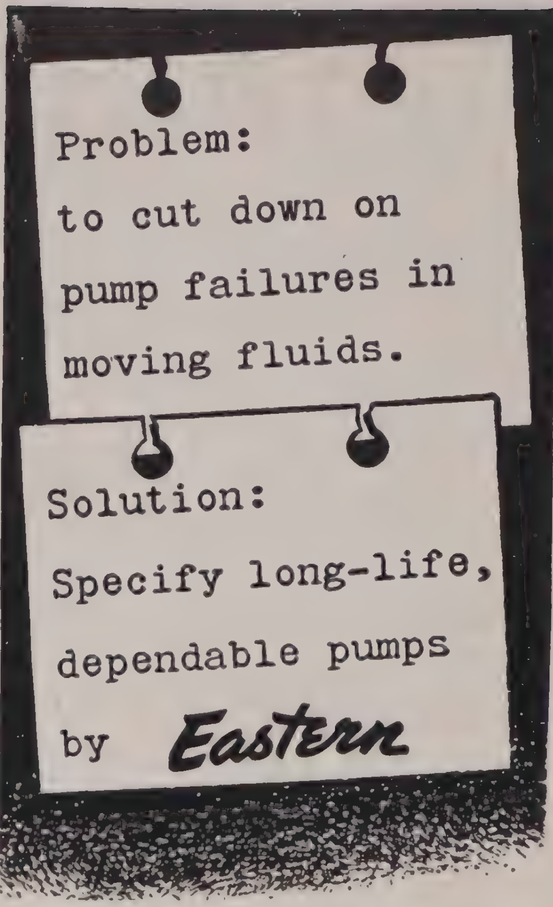
### Truck Batteries

Guide to selection of industrial truck batteries with engineering specifications for 100 different sizes and capacities is given in Bulletin GB-1055. Featured also are transparent vent plug and battery element support.—*Gould Storage Battery Corp., Trenton 7, N. J.*

### Fork Lift Operators' Guide

In addition to providing clear instructions for efficient operation of fork lift truck, op-

*(Food Equipment Continued)*


Problem:
to cut down on
pump failures in
moving fluids.

Solution:
Specify long-life,
dependable pumps
by Eastern

**Built to stand the gaff of long, multiple-cycle non-lubricating liquid pumping, Eastern GW Series Pumps operate efficiently and economically. They're quiet, consume little power and deliver uniform performance day in and day out.**

**The Eastern GW Series is precision-built in two sizes: GW-1, rated at ¼ G.P.M. and GW-2, rated at 1 G.P.M.—against pressures up to 200 P.S.I.—plenty of pumping power and volume for normal liquid transfer applications.**

**CHECK THESE FEATURES**

**Stainless steel drive gear; graphite carbon composition driven gear; no metal-to-metal contact; graphite impregnated bearing; hydraulically balanced; lifetime mechanical seal; tough bronze construction.**

**You can get immediate deliveries on both Eastern GW Series Pumps. They are supplied with 1/6 or 1/4 H.P. motors; belt driven or flexible coupling driven units are also available.**

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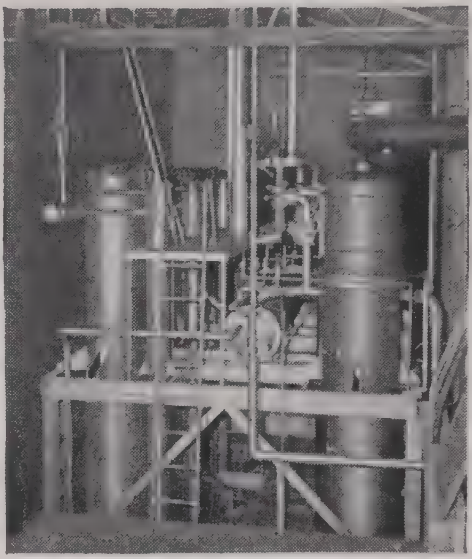
**INDUSTRIES, INC.**
**306 ELM STREET**
**NEW HAVEN 6, CONN.**

# $260,000.00*
## saved in 3½ months with

## mojonnier Lo-Temp Processing System

—second floor view



Model A Mojonnier Lo-Temp Evaporator in plant of Florence Citrus Growers Ass'n., Florence Villa, Florida. Unit has capacity of 375 gallons of concentrate per hour.

**PROBLEM:**

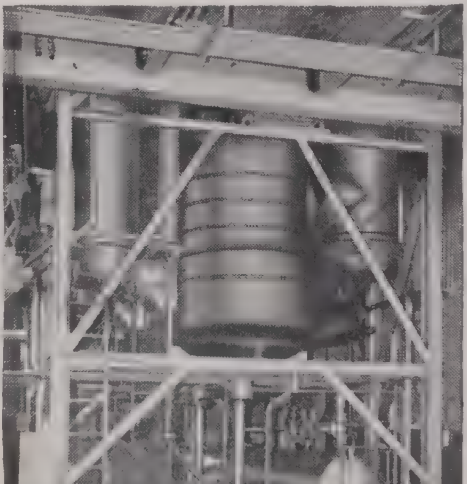
Florence Citrus Growers Ass'n., Florence Villa, Fla., operated a modern plant, producing high quality single-strength juice. The price of this juice was declining sharply. Also, can, carton and freight costs were rising. Profits fell off. How to use existing plant to produce a highly salable canned citrus juice—at lower cost?

**SOLUTION:**

Converted from single-strength juice to frozen concentrate, using a complete Mojonnier Lo-Temp Citrus Processing System.

**RESULTS:**

- 500,000 boxes of fruit processed into 4 to 1 concentrate between March 1 and June 15, sold in advance at better margin of profit than possible with single-strength juice.
- $.45 per box of fruit saved on cans.
- $.071 per box of fruit saved on cartons.
- * **$260,000.00 saved on these two items alone during 3½ months of canning.**
- Freight costs reduced 7 times.
- More profit for grower, processor, jobber. Consumer demand constantly increasing.



—first floor view.

**Mojonnier Lo-Temp Processing Systems are doing a big job on the frozen concentrate lines of leading American Processors. Consult with us now for all facts.**

**MOJONNIER BROS. CO., 4601 W. OHIO ST., CHICAGO 44, ILL.**

erators' guide includes sections on standa accessories and their use, suggestions for h dling materials and containers, and section load-handling technics. — *Towmotor Cor 1226 E. 152 St., Cleveland 10.*

**Container Conveyor**

Belt-type, narrow, straightline conveyi units for bottles, jars, cans and other containe are described with specifications and phot in Bulletin SBT-1. Bulletin SC-1 deals wi lateral curve chain conveyor for same pu poses.—*Island Equipment Corp., 27-01 Brid Plaza N., Long Island City 1, N. Y.*

**Hoists and Trolleys**

Information on hoists, including capacitie chain information and headspace-saving type and varieties of trolleys, is presented in Cata log H-449. Details of manner of operatio pictures of parts, specifications, and mainte nance are also given.—*National Screw & Mf Co., Chester Hoist Div., Lisbon, Ohio.*

**Mobile Step Ladder**

When weight is on mobile step ladder, au tomatic safety feature prevents rolling action reports 4-page folder. Ladders are on rolling casters, in styles from 1 to 6 steps, with o without handrails and woven wire baskets.— *The Ballymore Co., 3 S. Roberts Rd., Bryn Mawr, Pa.*

**Wire Belting**

For use in processing products during their movement from one location to another, wire belts woven of metals ranging through stainless, Inconel, brass, copper, nickel and Monel are suggested in Bulletin 89. Constructional features, varying types of selvages and cleats, are illustrated.—*The Cambridge Wire Cloth Co., Cambridge, Md.*

**Industrial Switching**

Diesel-electric locomotive for industrial switching is described, with information on economy in operation, in 16-page Bulletin GEA-3810.—*Apparatus Dept., General Electric Co., Schenectady 5, N. Y.*

## Control Equipment

**Distant Reading Thermometers**

Temperatures at widely separated or distant points (as much as 1,000 ft.) can be read wherever desirable if distant reading thermometers are installed, says Bulletin 2451-C. High accuracy in range between —100 and 400 F., with or without abridged scales, is also reported.—*Illinois Testing Laboratories, Inc., 420 N. LaSalle, Chicago 10.*

**Industrial Thermometers**

Indicating and recording thermometers of a variety of types are illustrated and described in 4-page bulletin with wide range of optional mountings for installation.—*The Electric Auto-Lite Co., Instrument and Gauge Div., Toledo 1, Ohio.*

**High Speed Photoelectric Control**

An accurate register of printed paper and cellophane is maintained, when the material is being cut for packaging, by use of photoelectric control detailed with specifications in Bulletin PD 476. Device also inspects for proper labeling on bottles and packages.—*Photoswitch, Inc., 77 Broadway, Cambridge 42, Mass.*

**Pressure Controllers**

Non-indicating pressure controllers available in three general types—for pressures higher than atmospheric, less than 4 lb./sq. in., or for pressures less than atmospheric—are illus-

*(Catalogs, Bulletins Continued)*

# CHAMPIONS

## On Every Count

Powerful performance, rugged good looks, extra economy, long life . . . you can demand any or all of these and get them in full measure in a GMC "450."

Truck-built for the tough truck transport jobs, these champions of the 2½-ton field pull their loads with brilliantly performing, GMC-built, 270 cubic inch "Army Workhorse" engines . . . they carry their loads on strong, sturdy chassis that have deep, stiff frames and heavy, rugged axles . . . and out front of the loads their "king sized" cabs offer comfort, convenience and safety that's unsurpassed.

Added to all this are such outstanding qualities as GMC's exclusive bumper-bar grille . . . gross weight ratings of 19,000 to 37,000 pounds . . . equipment options to meet the road and load characteristics of *your* hauling job. Your nearest GMC dealer has complete data.

**GMC TRUCK & COACH DIVISION • GENERAL MOTORS CORPORATION**

**GMC TRUCKS**

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comes in a
BARREL
If it is
PACKAGED
or a CASE

You can MOVE IT FASTER...
BETTER...
and at LOWER COST...

on a FINGERPRINT ENGINEERED

CONVEYING SYSTEM

Cost-conscious management, these days, is giving increased attention to the movement of goods and materials. Frequently changes suggested by Alvey-St. Louis engineers have resulted in real economies . . . in increased production . . . Want to know the reason why? From their years of experience Alvey-St. Louis engineers know that just like fingerprints, no two plants are identical. Each problem, therefore, is given individual study and attention . . . what we call Fingerprint Engineering. Without obligation, why don't you investigate what an Alvey-St. Louis engineered conveying system man can do for you? Detailed catalog will be sent on request.

ALVEY ST. LOUIS Conveyors

ALVEY CONVEYOR MFG. CO., 3203 S. Broadway, St. Louis 18, Mo.

trated with specifications and control data i Specification No. 852.—*Brown Instrumen Div., Minneapolis-Honeywell Regulator Co Wayne and Roberts Aves., Philadelphia 44.*

**Instruments and Control Valves**

A variety of primary and secondary flow instruments and control valves is described an illustrated in 24-page Catalog 50.—*Fischer & Porter Co., 50 County Line Rd., Hatboro, Pa*

**Measure and Control of Process Variables**

Temperature, voltage, current, speed, an similar variables, are indicated and controlle by panel-mounted instruments detailed in Bulletin PC-1.—*Wheelco Instruments Co., 847 W. Harrison St., Chicago 7.*

## Plant Supplies

**From Insecticides to Packaging Materials**

Phosphates for cheese, yeast foods, leavening and soft drinks, also synthetic flavors, benzoates, insecticides, and moisture-proof packaging materials are among products described in 24-page booklet.—*Monsanto Chemical Co., St. Louis 4.*

**Utility Shelving and Cabinets**

Steel wardrobe, storage and small-parts cabinets in different combinations and sizes, as well as easily assembled and rearranged utility shelving, are discussed in 14-page foldout.—*Standard Steel Equipment Co., Inc., 117-20 Fourteenth Rd., College Point, N. Y.*

**Silicates**

Manufacture, grades, and uses of varieties of silicates for adhesives, egg preservation, boiler compounds and detergents are covered in 20-page booklet.—*Diamond Alkali Co., 300 Union Commerce Bldg., Cleveland 14.*

**Dairy Sanitation**

Articles on sanitizers for the dairy farm, coatings for tin cans, and use of Plexiglas are featured in house organ, *Rohm & Haas Reporter*, Vol. 7, No. 4.—*The Rohm & Haas Co., Washington Sq., Philadelphia 5.*

**Transparent Film**

Gas-permeability without fogging or sliming is important feature of transparent film packaging material, Lumarith, described in 4-page folder.—*Celanese Corp. of America, Transparent Films Dept., Plastics Div., 180 Madison Ave., New York City 16.*

**Enclosed Industrial Safety Switches**

High interrupting capacity, quick make and break operations, and spot-welded cover hinges are among advantages provided by design of heavy duty switches detailed in 4-page Bulletin TEC 302A.—*Trumbull Electric Mfg. Co., Plainville, Conn.*

**Stronger Fire Extinguishers**

Polished silicon bronze in drawn-shell construction offers greater strength than previous models, weighs less, and can be held in place while being recharged, says information sheet. —*American-LaFrance-Foamite Corp., Elmira, New York.*

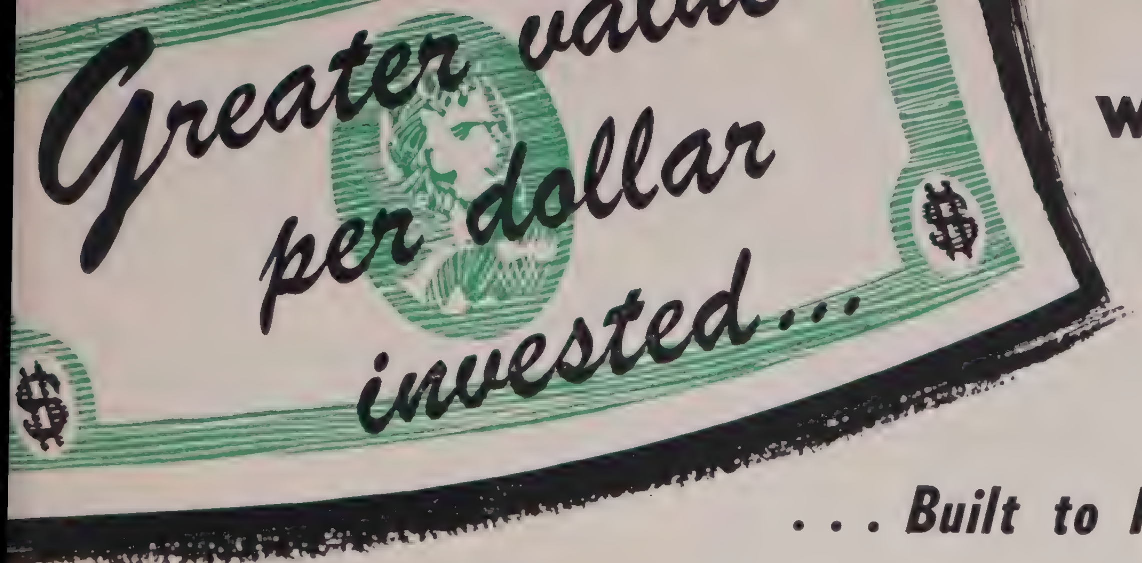
**Stapling Shipping Containers**

Heavy wire, self-closing staples for sealing shipping containers are suggested in 4-page folder, Ptg-218.—*Bostitch, 1369 Mechanic St., Westerly, R. I.*

**Small Diameter Steel Tubing**

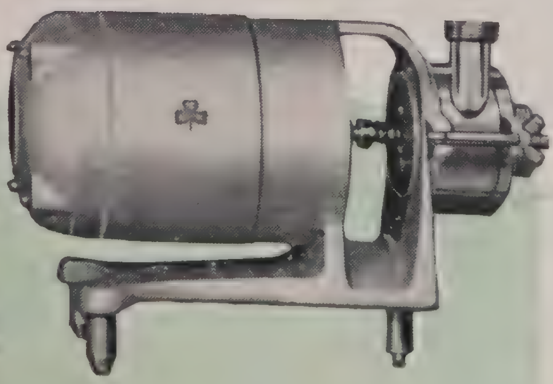
Cold drawn stainless steel mechanical capillary tubing from .008 in. to 1 in. o. d. is

(Catalogs, Bulletins Continued)



# Greater value per dollar invested... with TRI-CLOVER QUALITY PRODUCTS

## . . . Built to Perfection for Your Protection!

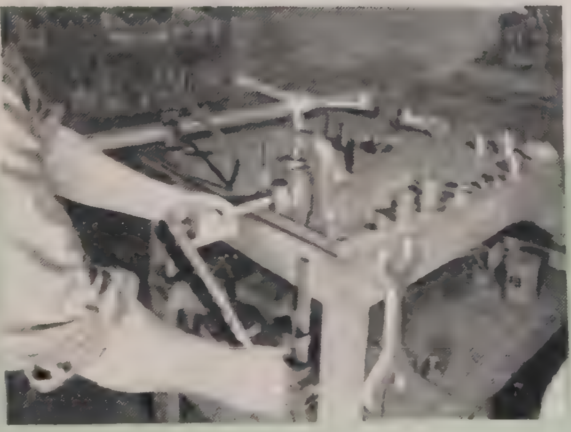


### W "PUMP KING" SERIES CENTRIFUGAL PUMPS

*es:* • Compact "Uni-" close-coupled con-on • All highly-pol-stainless steel contact • Perfect alignment • Eas-sassembled for cleaning d adjustable to any dis-e angle • One-piece sani-seal • Totally enclosed ry motors.

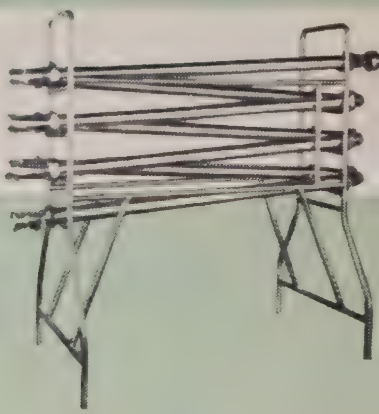
### NEW LIFT-TYPE PLUG VALVES

Downward pressure on the valve handle "cracks" the plug by working against a spring steel plate below the valve body. *Advantages:* Non-galling, seizing eliminated—Easier faster operation—No leakage—Simple cleaning—Complete sanitation.



### PER SPEED TOOLS OR 60% FASTER OINT ASSEMBLY

r your costs by in-ng and maintaining gs and lines with ER SPEED Tools. le, positive opera-makes it easy for inexperienced per-el to obtain ap-ed, leak-tight sanitary nded joints with Tri-r patented ferrules.



### PREFABRICATED ASSEMBLIES

Special all-sanitary holding tube assemblies to meet your specific requirements. Give us capacity desired, height, width and length limitations.

New REDUCED Prices now effective on all TRI-CLOVER SANITARY FITTINGS!

### EW STREAMLINE REDUCERS

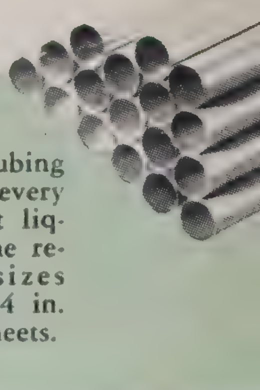
made in both eccen-and concentric types, new streamline re-rs provide full, un-icted liquid flow—as-g complete sanita-ease of assembly and cleaning.

### SPECIAL ITEMS

A complete line of specialties, such as flush type bottom outlet valves, mixing type valves, truck tank valves, etc., are available to meet individual requirements.

### TUBING

Stainless steel tubing is available for every corrosion-resistant liquid conveying line requirement, in sizes from 1 in. thru 4 in. Send for price sheets.



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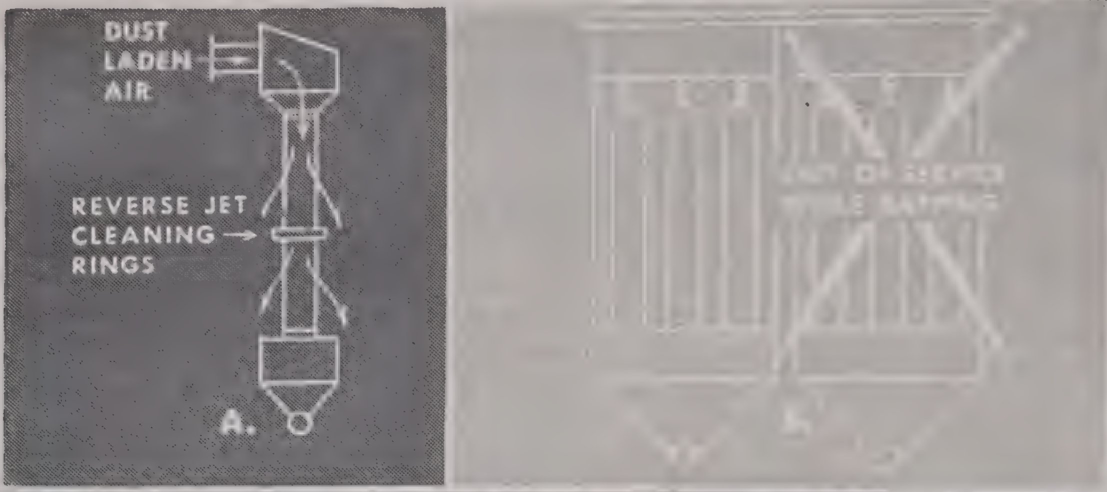
TRIALLOY AND STAINLESS STEEL SANITARY FITTINGS, VALVES, PUMPS, TUBING, SPECIALTIES

FABRICATED STAINLESS S INDUSTRIAL FITTINGS A INDUSTRIAL PUMPS

Eliminate Shutdowns

FOR DUST FILTER CLEANING!



NEVER A SECTION OUT OF SERVICE

DAY "Autoclean" DUST FILTER

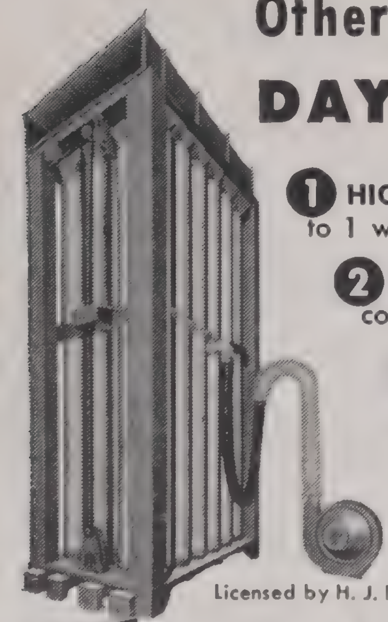
Fifty-eight plants in the food industry are now securing continuous dust recovery with constant air volumes through installation of the new **DAY** "Autoclean" Dust Filter.

The **DAY** "Autoclean" Dust Filter provides *continuous-automatic operation* . . . completely eliminating cleaning shut-downs! This results in the low constant back pressures and uniform air volumes necessary for maximum dust collection efficiency.

Figure A shows how reverse jet cleaning rings travel slowly up and down the tubes of the **DAY** "Autoclean" Dust Filter blowing high pressure air back through the felt in a *continuous cleaning action* with a maximum cloth area loss of only 1¾%.

Most other types of filters require shutting down sections for cleaning. This may amount to 50% of the cloth area as indicated in Figure B.

Other Advantages of the DAY "Autoclean" Dust Filter:



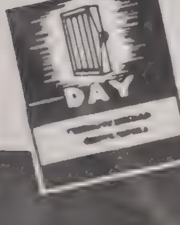
① **HIGH AIR TO CLOTH RATIOS**—10, 15 or 20 to 1 with uniform low back pressures.

② **CONSTANT AIR VOLUME**—Assured by continuous cleaning of all filter tubes.

③ **HIGH CLEANING EFFICIENCY**—Gentle reverse jet cleaning permits use of quality felt filtering cloth.

④ **PARALLEL AIR FLOW**—Dust and air traveling downward together help deposit dust for discharging.

Licensed by H. J. Hersey, Jr



*Write-to*-**DAY** for new "Autoclean"
Dust Filter Bulletin No. 491

The **DAY** Company

817 3rd Avenue N. E. • Minneapolis 13, Minnesota
IN CANADA: Box 70D, Ft. William, Ont.
*Branch plants in Ft. Worth, Buffalo and Welland, Ont.*

covered in 8-page folder. Statistical data on size range, analyses and tolerances, plus charts giving heat resistance, workability, physical characteristics and applications, are included.—*J. Bishop & Co. Platinum Works, Stainless Steel Products Div., Malvern, Pa.*

**Emulsifying Detergent**

Comparisons among many types of detergent materials with behavior of each are detailed in 4-page folder which concerns non-flammable, non-toxic emulsifying cleaner.—*The Brooks Boiler Treatment Co., 3304 E. 87 St., Cleveland 4.*

**Fast Hot-Spray Cleaning Method**

Mechanized hot-spray cleaning technic speeds clean-up and cuts costs, reports 8-page folder. Method utilizes caster-mounted unit that sprays hot detergent under pressure.—*Oakite Products Inc., 26G Thames St., New York City 6.*

**Protective Coatings**

Tough corrosion problems in industrial plants are said in 4-page folder, to be solved by use of specialized industrial protective coatings. Materials with vinyl, phenolic, fish oil or chlorinated rubber bases can be applied to metal, concrete or wood.—*United Chromium, Inc., 51 E. 42 St., New York City 17.*

## Miscellaneous

**Corrosion-Resistant Metals**

Data on corrosion resistance of stainless, Monel and nickel castings to aid engineers in the selection of proper alloys for processing equipment are given in 4-page booklet.—*The Cooper Alloy Foundry Co., Hillside, N. J.*

**Rapid Milking**

An article on rapid milking is available in reprint form to milk plant operators for distribution to their patrons, announces 5-page bulletin in which article appears.—*Klenzade Products, Inc., Beloit, Wis.*

**Safety Hints**

Articles on materials handling and safety in plants appear in 22-page house organ, *American Mutual Magazine of Loss Control for Industry,* July 1949.—*American Mutual Liability Insurance Co., 142 Berkeley St., Boston 16.*

**Interoffice and Factory Communication**

Flexible system of interoffice and factory communication is described, with hook-up diagrams and photos, in 6-page foldout.—*Mark Simpson Mfg. Co., 32-28 49 St., Long Island City, N. Y.*

**Viscometer**

Instrument for measuring viscosities of thixotropic and non-thixotropic liquids is detailed in 8-page brochure.—*Brookfield Engineering Laboratories, Inc., Stoughton, Mass.*

**Laboratory Autoclaves**

Different models of autoclaves, including a rectangular portable type, are described and illustrated on information sheets.—*American Sterilizer Co., Erie, Pa.*

**Heating Factories**

"Selection and Location of Unit Heaters in Factory Buildings" is recommended article in house organ, *Weather Magic,* Vol. 13, No. 5.—*The Trane Co., La Crosse, Wis.*

**Light Ladders**

Magnesium ladders in single, step, and extension types are illustrated and described in 4-page foldout.—*A. W. Flint Co., P. O. Box 1598, New Haven, Conn.* —*End*

# SMILE when they say,

# "LET'S CUT CANS!"

YOUR FOODS CAN HAVE

A DRAMATIC "EDGE"

IN FLAVOR AND

CUTTING CANS WILL PROVE IT!

## Unusual new product—*Ac'cent*—intensifies the flavor of food, definitely combats "flavor-loss" . . . at remarkably low cost

At no obligation to you—quickly—easily, we can show you the surprising improvement a bit of Ac'cent makes in the flavor of *one of your own foods!*

You be the judge . . . and prepare to be astonished!

You've probably heard about Ac'cent. New as it is to general use, its amazing effectiveness has been proven over and over again. Its economy is being established every day in certain food processing plants and in famous dining places.

Ac'cent is not a flavoring, not a condiment. It adds no flavor, aroma or color of its own. It simply, but wonderfully, brings out—and *holds*—the NATURAL flavors of foods. With Ac'cent, you use your own formulas. You prepare and cook as usual—just add Ac'cent.

Write or phone for information. Our staff of food technologists is on call to discuss with you in your plant the possibilities of Ac'cent in the foods you pack.

**Amino Products Division**
**International Minerals & Chemical Corp.**
**20 North Wacker Drive, Chicago 6, Illinois**

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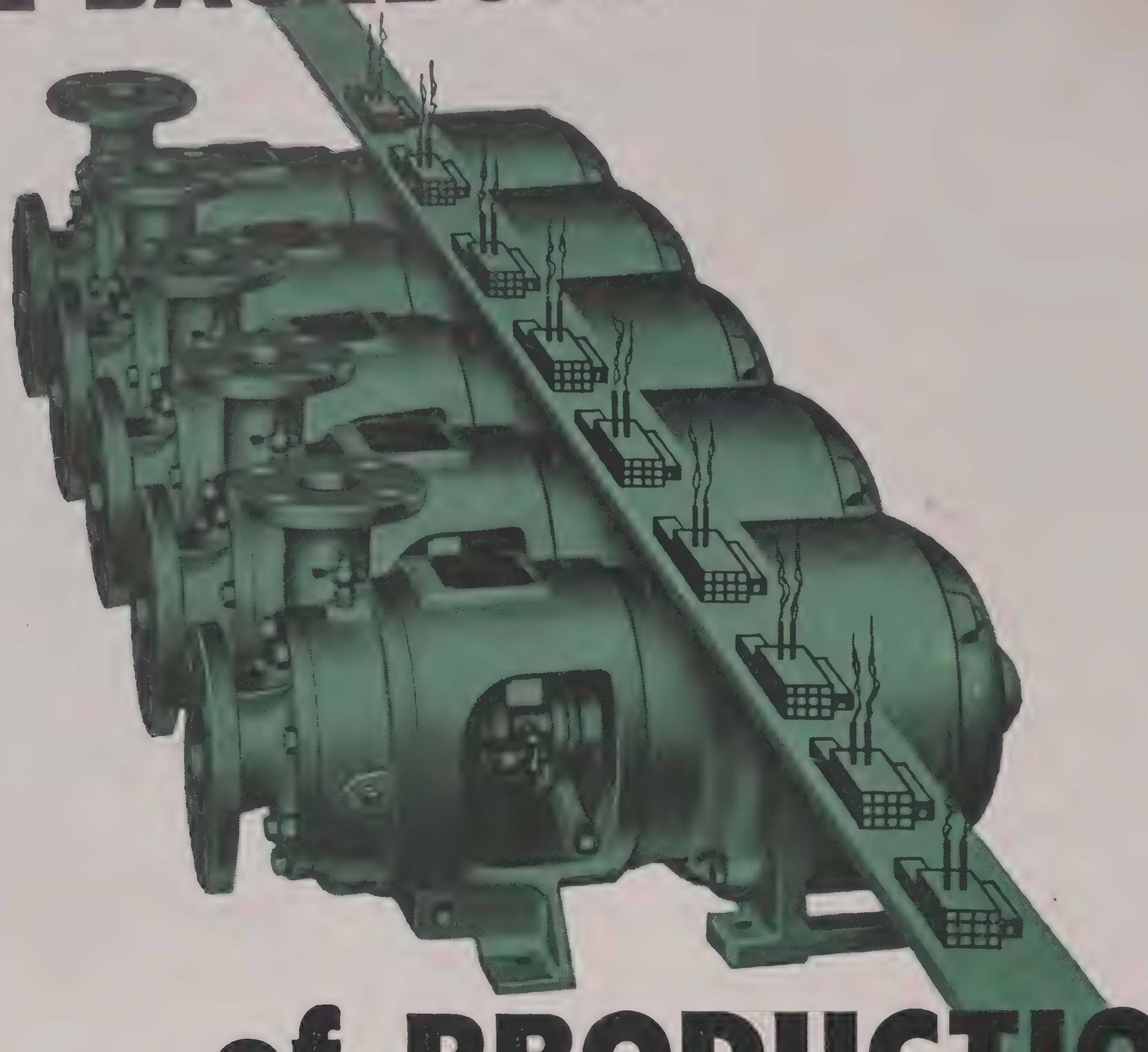
Ac'cent
MASTER SEASONING
PURE
MONO SODIUM
GLUTAMATE
Manufactured by
Amino Products
Division
INTERNATIONAL MINERALS & CHEMICAL CORP. CHICAGO ILL.

Ac'cent is a 99+% pure monosodium glutamate, derived from vegetable sources. It is a wholesome product of Nature. In 100 and 200 lb. drums.

Ac'cent® makes food flavors sing

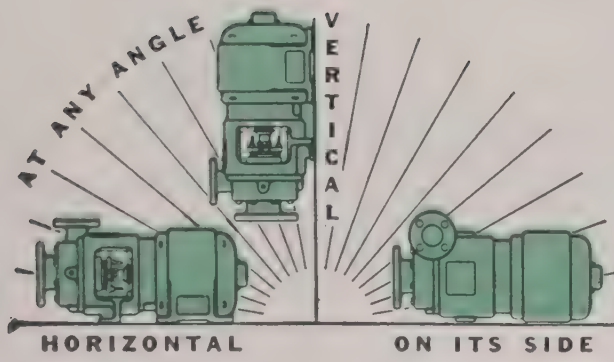
Trademark "Ac'cent" Reg. U.S. Pat. Off. Printed in U.S.A.

# THE BACKBONE



# of PRODUCTION

## the Ingersoll-Rand MOTORPUMP



No matter what the processes in your phase of manufacture, there undoubtedly are pumps involved . . . pumps that are the backbone of your production. When you think of pumps in this light, dependable pumps mean continuous production.

When you talk about dependable close-coupled pumps you're talking about the INGERSOLL-RAND MOTORPUMP line. There are hundreds of sizes and models available to meet a multitude of conditions. These are compact, self-contained units built for heavy-duty service.

Each MOTORPUMP is just what the name implies . . . an electric motor and pump combined. Special motors are equipped with extra-heavy shafts and bearings. The pump with balanced impeller is assembled directly on the motor shaft. This compact construction gives perfect balance, vibrationless operation and extreme rigidity. The MOTORPUMP involves no large installation cost because it requires no special foundation, will operate efficiently in any position, horizontally, vertically, at any angle or on its side. Sizes ¼ to 40 horsepower . . . gallons to 1800 per minute . . . heads to 600 feet.

You can depend on Ingersoll-Rand MOTORPUMPS to ease your pumping headaches. Factory trained pump specialists from coast to coast are always ready to help you and can give you prompt shipment.

**COMPRESSORS**
**TURBO BLOWERS**
**OIL & GAS ENGINES**
**PUMPS**
**CONDENSERS**
**AIR TOOLS**
**ROCK DRILLS**

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Cameron Pump Division
11 Broadway, New York 4, N. Y.

423-9

# Patents

Candy Canes Packaged to Prevent Breakage During Shipment—*C. M. Sogas and Sam M. Sogas, Kansas City, Mo.* No. 2,476,923. *July 19, 1949.*

Fruits and Vegetables Mechanically Peeled During Passage Under Liquid Spray Heads Along Cylindrical Rolls With Abrasive Surfaces—*O. P. Pierson, Caribou, Maine.* No. 2,477,006. *July 26, 1949.*

Sausages Linked by Mechanical Molds—*J. Armbrust, one-half to Christ W. Eckhert, Chicago, Ill.* No. 2,477,031. *July 26, 1949.*

Sugar Beet Juices Clarified After Liming Treatment by Passage Through Cation Exchanger Operating in Hydrogen Cycle—*T. M. Rinehart, to Darco Dorp., Wilmington, Del.* No. 2,477,206. *July 26, 1949.*

Blood Protein Converted Into Foam-Stabilizing Agent by Heat-Treating to Destroy Antienzymes, Hydrolyzing With Proteolytic Enzyme and Treating With Water-Soluble Salt of Heavy Polyvalent Metal—*H. L. Keil, and J. S. Ingraham, to Armour and Co., Chicago.* No. 2,477,255. *July 26, 1949.*

Sausages Smoked on "Stick" Consisting of Two Relatively Thin Rigid Horizontally Arranged Plates Connected in Spaced Parallel Relation to Each Other—*O. G. Mayer, Jr., Evanston, Ill. to Oscar Mayer & Co., Inc., Chicago.* No. 2,477,413. *July 26, 1949*

Fresh Corn Kernels Mechanically Removed From Cobs Without Damage to Kernels—*C. G. Ewertz, Des Moines, Iowa.* No. 2,477,445. *July 26, 1949*

Gelatin Whipping Properties Improved by Treatment With Condensation Product of Inositol and Phosphoric Acid, or Molybdic Acid, Polymolybdic Acid, Tungstic Acid, Polytungstic Acid, Phosphotungstic Acid, or Phosphomolybdic Acid or Their Salts—*D. P. Grettie and H. H. Young to Swift & Co., Chicago.* No. 2,477,539. *July 26, 1949.*

Perishable Foods Dried to About 12 Percent Moisture Content. Frozen. And Held in Frozen Storage Without Rehydration—*L. B. Howard and W. D. Ramage, and C. L. Rasmussen, to U. S. A.* No. 2,477,605. Aug. 2, 1949.

Evaporated Milk or Other Foaming Liquids Filled Into Containers With Small Inlet Openings in Which Air Is Displaced With Steam—*G. Grinrod, Oconomowoc, Wis.* No. 2,477,692. Aug. 2, 1949.

Coating for Foods and Packages Made to Consist of Water, Edible Gelatin, pH Controlling Agent and Propylene Glycol—*L. A. Hall to Griffith Laboratories, Inc., Chicago.* No. 2,477,742. Aug. 2, 1949.

Concentrated Corn Steepwater Acidified to pH of 3.0 to 3.7 for Growing *Penicillium* Molds—*W. W. Moyer to A. E. Staley Mfg. Co., Decatur, Ill.* No. 2,477,763. Aug. 2, 1949.

Sausages Packaged in Cellulose Casing Treated With Soluble, Edible Coloring Which Transfers to Surface of Sausage on Contact—*R. K. Remer, to Transparent Package Co., Chicago.* No. 2,477,767. Aug. 2, 1949.

Foods Artificially Colored by Packaging Inside Permeable Film Impregnated With Soluble Coloring Material Which Transfers to Contents Upon Contact—*R. K. Remer, to Transparent Package Co., Chicago, Ill.* No. 2,477,768. Aug. 2, 1949.

Wheat, Rye and Other Cereals Treated With Oxide of Chlorine to Bleach Pigment of Husk Before Milling—*C. H. Evans, Snaresbrook, London, England.* No. 2,478,043. Aug. 2, 1949.

Continuous Laminated Biscuit Dough Formed by Mechanical Means—*G. R. Baker, Peterborough, England.* No. 2,478,075. Aug. 2, 1949.

Glyceride Oils Freed of Free Fatty Acids by Subjecting Confined Flowing Stream of Water and Oil Mixture to Between 200 and 300 C. in Vapor Separating Chamber Under Vacuum—*B. Clayton, Houston, Tex. to B. Clayton, Doing Business as Refining, Unincorporated.* No. 2,478,089. Aug. 2, 1949.

Bread Made by Adding Water to Flour, Washing Starch Out of Gummy Mass, Cooking Starch Suspension, Concentrating it, and Then Returning it to Dough Which Is Mixed and Handled in Usual Way—*J. J. Hennessy, Fairhaven, Mass.* No. 2,478,099. Aug. 2, 1949.

Buckwheat Extracted For Recovery of Rutin—*R. K. Eskew, to U. S. A.* No. 2,478,168. Aug. 9, 1949.

*(Patents Continued)*

STAINLESS STEEL **THOMSEN** NICKEL ALLOY
*Equipment for the Processing Industries*
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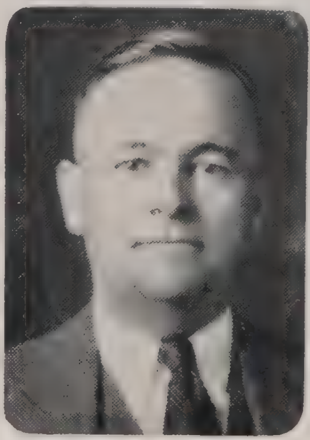

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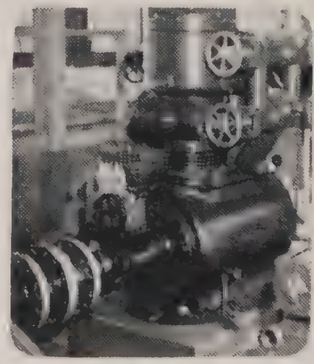

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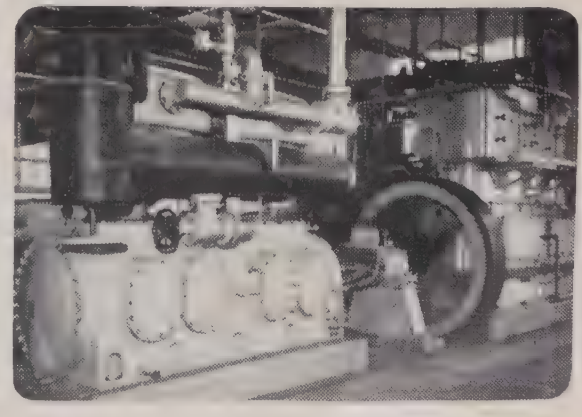

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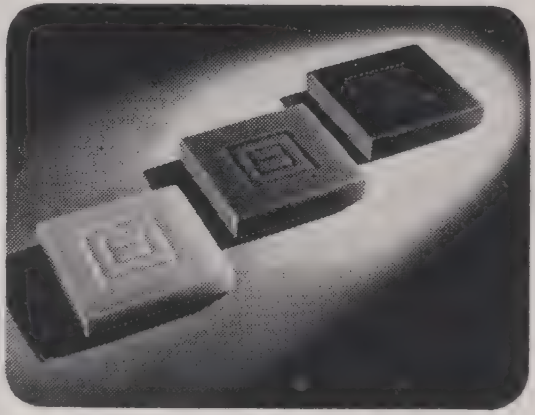

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Flavoring Syrup Frozen in Beverage Bottle to Inhibit Excessive Foaming During Filling of Bottle With Carbonated Water—*J. L. Kellogg, Chicago.* No. 2,478,169. Aug. 9, 1949.

Pectin Solution Treated With Alkaline Reagent Under Controlled Conditions to Give Low-Methoxyl Pectin of 2.6 to 4.6 Percent Methoxyl Content—*W. D. Maclay and Rolland M. McCready, to U. S. A.* No. 2,478,170. Aug. 9, 1949.

Red Fruit Treated Before Cooking with Water Soluble Molecularly Dehydrated Phosphate to Stabilize Natural Red Color—*G. O. Hall, to Hall Laboratories Inc., Pittsburgh, Pa.* No. 2,478,266. Aug. 9, 1949.

Grape Juice Subjected to Ion Exchanger in Hydrogen Cycle to Reduce Concentration of Potassium Bitartrate in Juice to Less Than That of Saturated Solution—*E. E. Meschter, and K. W. Seiter, to Grape Belt Preserve Co., Westfield, N. Y.* No. 2,478,298. Aug. 9, 1949.

Glycerine Recovered From Fermentation Concentrates by Treatment With Propyl Lactate—*N. M. Mnookin, to Colgate-Palmolive-Peet Co., Jersey City, N. J.* No. 2,478,417. Aug. 9, 1949.

Gun-Puffed Ready-to-Eat Breakfast Cereals Made From at Least Two Different Cooked Coarse Particles of Cereals and Legumes—*J. J. Thompson and W. P. Penty to Kellogg Co., Battle Creek, Mich.* No. 2,478,438. Aug. 9, 1949.

Packaged Foods Frozen During Passage in Circular Path Through Refrigerating Chamber—*G. F. Dodson, San Jose, Calif.* No. 2,478,465. Aug. 9, 1949.

Bacon Substitute Made From Emulsion of Comminuted Pork Skin and Milk, Chopped Meat and Pieces of Fresh Pork Meat, by Curing, Compressing and Smoking—*M. Baur, Vancouver, B. C. Canada.* No. 2,478,520. Aug. 9, 1949.

Prepared Dough Containing Slow-Acting Leavening Agent Packaged in Container to Limit Expansion of Dough Following Initial Relatively Rapid Evolution of Gas and to Retain Gas From Slow-Acting Baking Acid in Dough—*L. Armstrong and L. B. Willoughby to Ballard & Ballard Co., Louisville.* No. 2,478,618. Aug. 9, 1949.

Dough Sheeted in Unit With Beater Oscillating in Timed Relation to Advance of Endless Belt Conveyor to Subject Dough at Any One Point on Conveyor to Multiple Beating Action—*J. Buechek, Kokomo, Ind. one-half to American Bakers Machinery Co., St. Louis.* No. 2,478,685. Aug. 9, 1949.

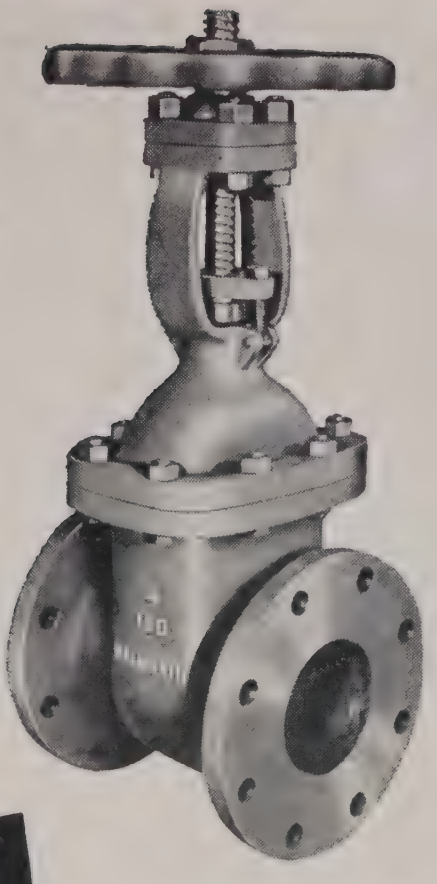
Edible Liquids Sterilized During Continuous, Rapid, Turbulent Flow Through Small Cross-Section Area With Rapid Heating to at Least 55 C. in Less Than One Second, at Least 80 C. in Two Seconds and Finally to 130 C. for Complete Inactivation of Oxidases—*J. de Boer, to Commercieele Bank N. V., The Hague, Netherlands.* No. 2,478,748. Aug. 9, 1949.

Amino Acids Prepared by Condensing Acetamidomalonic Ester in Presence of Sodium Alcoholate With Benzyl Chloride—*H. R. Snyder, and Max Tishler, to Merck & Co., Inc., Rahway, N. J.* No. 2,478,788. Aug. 9, 1949.

Frozen Foods Liquefied by Combination of Mechanical Disintegration and Electrical Heating—*D. O. Brant, Beverly Hills, Calif.* No. 2,478, 893. Aug. 16, 1949.

(Patents Continued)

# Newly Designed Walworth Valves to combat corrosion



Walworth 150-pound Stainless Steel Gate Valve . . . available in sizes ½ to 3-inch, screwed; ½ to 12-inch, flanged.

**Made of Stainless Steel**
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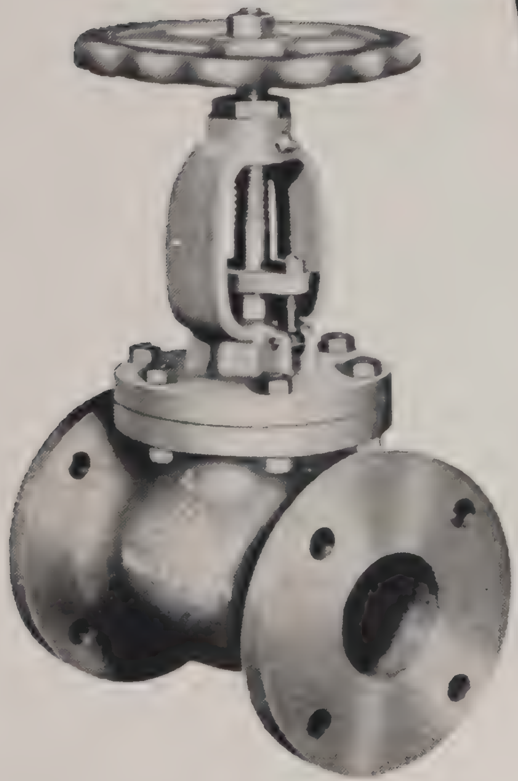

Walworth 150-pound Stainless Steel Globe Valve . . . available in sizes ½ to 3-inch, screwed; ½ to 6-inch, flanged.

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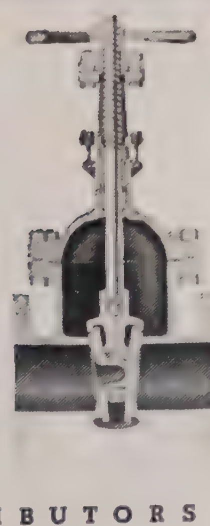
Walworth offers a comprehensive line of valves made of several cast stainless steels and special alloys for piping services where corrosion is a factor. These valves are available in Gate, Globe, Angle, Check, and Lubricated Plug types.

Gate, Globe and Angle Valves have outside screw and yoke construction, thus keeping the stem threads out of contact with the corrosive material in the line. They also have a two-piece bolted gland with ball-type gland follower to prevent binding the stem when packing bolts are tightened. Gland eye-bolts can be conveniently swung out of the way without danger of loss when the gland is lifted for repacking.

Gate Valves have taper seats with a unit consisting of two flat faced discs supported by a carrier on the end of the stem. The discs are of a proven ball-and-socket type. They are free to rotate and adjust themselves to the body seat angles, assuring tight seating with no possibility of sticking in any position.

For further information about Walworth's full line of corrosion-resistant valves, see your Walworth distributor.



Sectional view of Walworth 300-pound Stainless Steel Gate Valve . . . available in sizes 2 to 6-inch, flanged.

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# ADM Supersoy

Foods Dried in Closed Circuit Where High Temperature Inert Drying Gases are Circulated—*A. W. Koon, Luling, La.* No. 2,478,970. *Aug. 16, 1949.*

Sugar Juice Purified by Centrifuging Partially Concentrated Juice to Remove Centrifugally Separable Impurities Before Evaporating Further—*H. O. Lindgren, to Akt. Separator, Stockholm, Sweden.* No. 2,478,971. *Aug. 16, 1949.*

Solution of Water and Acid-Soluble, Heat-Stable, Propylene Glycol Alginate Added to Acid-Reacting Beverage to Stabilize Foam—*J. S. Wallerstein, A. L. Schade and H. B. Levy to Wallerstein Co., Inc., New York City.* No. 2,478,988. *Aug. 16. 1949.*

Protein Recovered From Solvent-Extracted Flaked Oilseed Residue—*G. Davidson, Aurora, Ill.* No. 2,479,040. *Aug. 16, 1949.*

Water Solutions of Glycerine Concentrated by Consecutive Action of at Least Two Organic Solvents Which Are Miscible Selectively With Water and Glycerine, and Glycerine Recovered From Phases in Which it is the Larger Portion—*J. C. Elgin, to Colgate-Palmolive-Peet Co., Jersey City, N. J.* No. 2,479,041. *Aug. 16, 1949.*

Concentrated Sweet Fat or Solid Cream Mechanically Shaved as Block is Forced Against Scraping Edges by Piston Action—*J. B. Orrell, to Abbotts Dairies, Inc., Philadelphia.* No. 2,479.080. *Aug. 16, 1949.*

Food Products Prepared for Quick-Freezing by Passing Through Steam Which Is Drawn Into Products by Suction, Applying Cooling Bath to Steamed Product and Packaging—*M. J. Lamperti, San Rafael, Calif.* No. 2,479,171. *Aug. 16, 1949.*

Fruit Cut and Juice Expressed in Machine Equipped With Rotary Slicing Disk and Expressing Rolls—*N. Eastman, New York City.* No. 2,479,194. *Aug. 16, 1949.*

Citrus and Pineapple Pulp, Leaves and Hulls Ground and Used as Binder in Phenol Formaldehyde Resin Mixes—*O. W. Schroeder, Los Angeles, Calif. 20 percent to W. E. Beatty, Los Angeles and 3/100ths to B. A. Milnar, St. Paul.* No. 2,479,270. *Aug. 16, 1949.*

Storage-Stable Product Made by Mixing Liquid Eggs With Liquid Milk Product and Edible Liquid Fat Into Oil-in-Water Emulsion Before Spray Drying—*E. K. Chapin, Chicago.* No. 2,479,310. *Aug. 16, 1949.*

Oil-Free Soybean Meal Processed to Isolate Undenatured Protein—*J. J. Eberl, and R. T. Trelfa, to Hercules Powder Co., Wilmington, Del.* No. 2,479,481. *Aug. 16, 1949.*

Oil Separated From Crude Protein Material Containing Substantial Portions of Starch and Oil—*H. H. Schopmeyer, to American Maize-Products Co.* No. 2,479,519. *Aug. 16, 1949.*

Pineapples and Like Discharged in Continuous Mass Movement From Truck by Means of Moving Bed and Conveyor—*M. Bainbridge, N. Fujii, and N. Morishige, to Maui Pineapple Co., Ltd., Honolulu.* No. 2,479,665. *Aug. 23, 1949.*

Apple Essence of at Least 25-Fold Strength Obtained by Vaporizing Volatile Flavors From Apple Juice and Recovering by Condensing and Absorption—*R. P. Homiller, and E. L. Griffin, Jr., to U. S. A.* No. 2,479,745. *Aug. 23, 1949.*

*—End*

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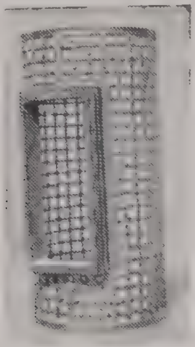

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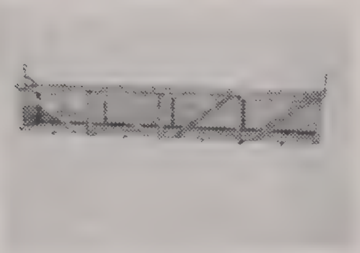

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## Potato Peeling Loss

—Continued from page 69

and Green Mountain varieties, and the least loss for Sebago, Russet Rural and Katahdin.

Within varieties, there were instances of considerable differences in loss in lots from different sources. For example, there was a greater loss for Maine-grown Irish Cobbler and Green Mountain potatoes than for the same varieties from other localities. Here is a possible explanation for this: Certain varieties, or lots of the same variety, may possess characteristics of texture that render the underlying tissue more susceptible to abrasive action.

From a study of the time required in the peeler, as shown in Table II, it does not appear that there is any consistent correlation between time and loss to account for these differences. Trimming loss was somewhat greater with the Irish Cobbler and Triumph varieties. This might be expected because of the depth of the eyes.

Lowest trimming loss was for the smoother varieties with shallower eyes, such as Sebago and Katahdin. The time required for hand trimming was not recorded. But this should be taken into account commercially.

In commercial operations, much waste can be prevented by proper timing of the mechanical peeling process. In view of the differences in peeling loss shown herein, it is recommended that a check run be made on each lot of potatoes to determine the minimum time required to do a good job of peeling.

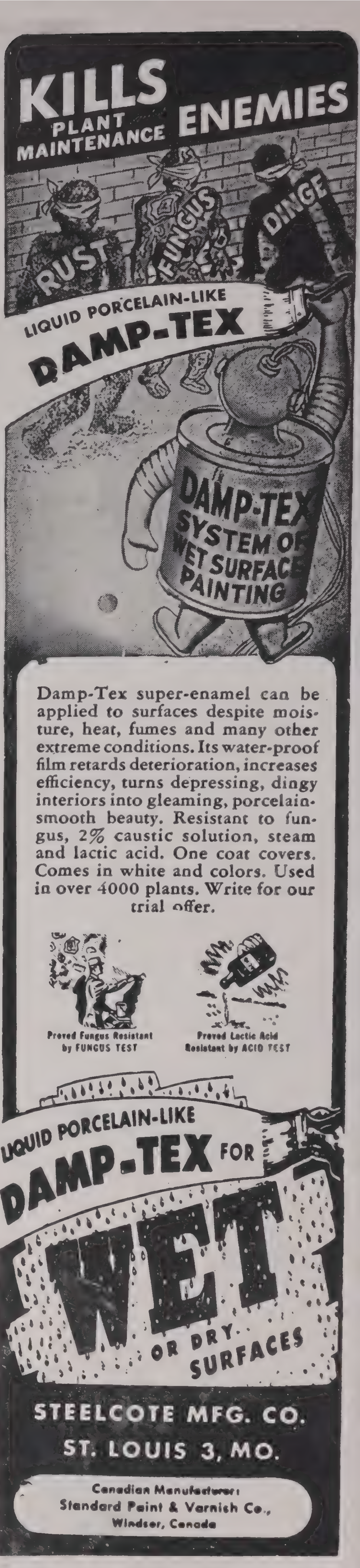
—End—

## Meat Prepackagers

—Continued from page 91

be tailored to meet optimum conditions for preservation of quality and appearance of product. Microbiology of meat packaging will receive closer attention. Reactions involving color changes in meat will be studied in greater detail. Out of these studies will come a more intelligent understanding of how to cope with the conditions that produce undesirable changes in the quality of packaged meats.

What has been said about fresh meats also applies in great measure to cured and ready-to-eat products. However, in the case of the latter products, packaging can be done by the packer as well as the retailer. Indeed, packaging of bacon, dried beef, ham, picnics, butts and fresh pork sausage had been carried out long before prepack-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# WORTHINGTON

# REFRIGERATION REPORT

**WORTHINGTON PUMP AND MACHINERY CORPORATION**
**HARRISON, NEW JERSEY**

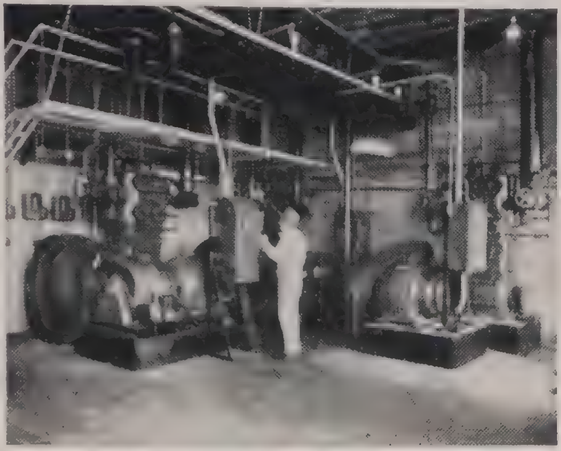
*Specialists in air conditioning*
*and refrigeration*
*for more than 50 years*

## Putting A Quick Freeze On Perishables

In 16 minutes flat, Worthington compressors freeze peas, corn, strawberries, cauliflower and boysenberries at Kelley, Farquhar & Company in Salem, Oregon.

To provide the extreme cold for the quick-freezing and low-temperature air (minus 6° F) for a 100' x 120' x 14' storage room are five Worthington compressors—three 8½ x 8 vertical duplex ammonia compressors and two 17 x 11 horizontal single-stage ammonia booster compressors.

Kelley, Farquhar & Co. have recently installed an additional 7 x 7 vertical ammonia compressor to hold the storage temperature during the winter months. This compressor was added so that it would not be necessary to use a large compressor during these months, thus realizing a substantial saving in operating cost.



*Three Worthington 8½ x 8 vertical ammonia compressors at Kelley, Farquhar & Co., Salem, Oregon*

## How They Keep Fish Fit In Atlanta, Georgia

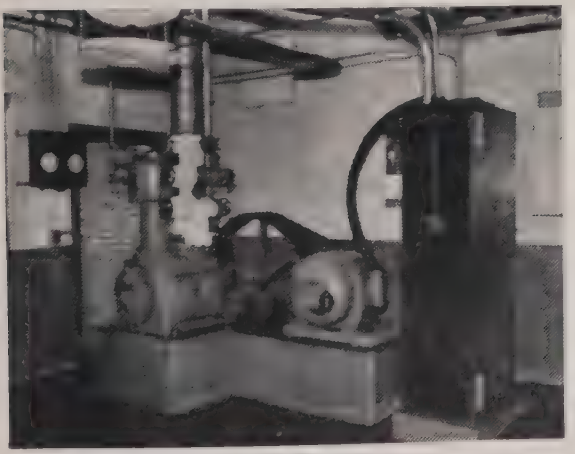
When, for the fifth time in 21 years, increased volume of business made it necessary for the Capitol Fish Company of Atlanta to go into new quarters, the management took advantage of the opportunity to install the most modern machinery for freezing and storing fish and other quick-frozen commodities under closely controlled temperature conditions.

For the refrigeration compressors, Worthington equipment was selected by the consulting engineer, C. T. Baker of Atlanta.

The freezing takes place in a room containing approximately 430 square feet and having a freezing capacity of 15 tons a day. Temperature is maintained at minus 28 to 30° F by means of a Worthington 4¾" x 3⅜" 6-cylinder ammonia booster compressor, operated at 720 rpm and rated at 12½ tons refrigeration at minus 41° F suction temperature.

Zero temperature storage rooms are served by two Worthington 8" x 8" single-acting vertical ammonia compressors, rated at 26.6 tons each and operating at 5 psi suction, 185 psi discharge pressure. They are driven by electric motor through V-belts. Starting and stopping are controlled by thermostat, providing a narrow pre-determined temperature range.

The high temperature storage rooms and the vestibule connecting the rooms are cooled by a 4" x 4" twin-cylinder Worthington Ammonia Compressor operating at 400 rpm.



*Worthington 8" x 8" Ammonia Compressor for zero temperature storage rooms*

## Two Good Catches Bring Cheers

The good "catch" Del Mar Canning Co. made in selecting Worthington refrigeration equipment for its new fish packing plant at Warrenton, Oregon, evidently is as pleasing to company executives as its catch of tuna, salmon, sardines and crabs.

*Del Mar Canning Co., Warrenton, Oregon*

"These machines have given excellent service," reports one Del Mar executive, referring to the three Worthington refrigeration compressors used for freezing whole fish and fillets, and for making ice. The Worthington equipment includes one 10 x 10 and one 7 x 7 vertical ammonia compressor and 1 ammonia booster compressor. This plant has a storage capacity of 800 tons of fish.

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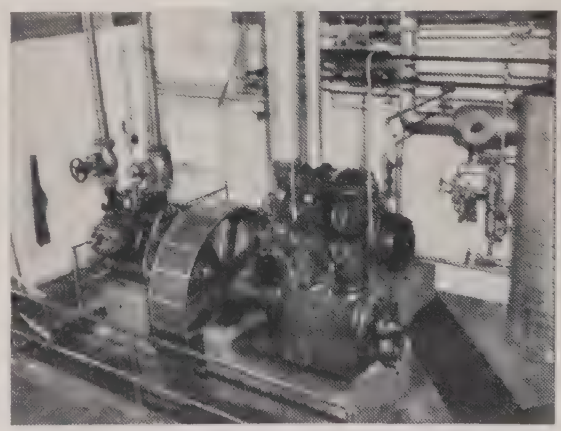

*Worthington Ammonia Booster Compressor at Del Mar Canning Co.*

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RESEARCH REPORT

NUMBER THREE

ON THE PROGRESS OF MAKING DRY SEPARATIONS BY SPECIFIC GRAVITY THROUGH AIR-FLOTATION

COMPILED FROM SIXTY-ONE YEARS OF SPECIALIZED EXPERIENCE IN SEPARATIONS

Problem:

*To recover clean mica from low grade ore.*

Solution:

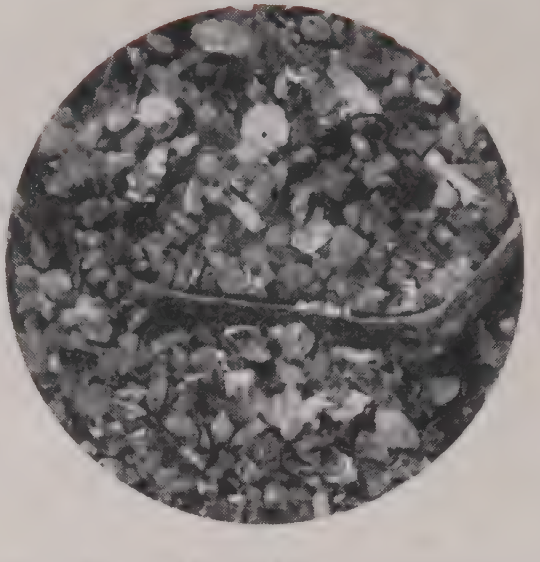
*S S & S Process—Air-Flotation.*

Here is photographic evidence* illustrating another successful application of *separation by specific gravity through air-flotation.*

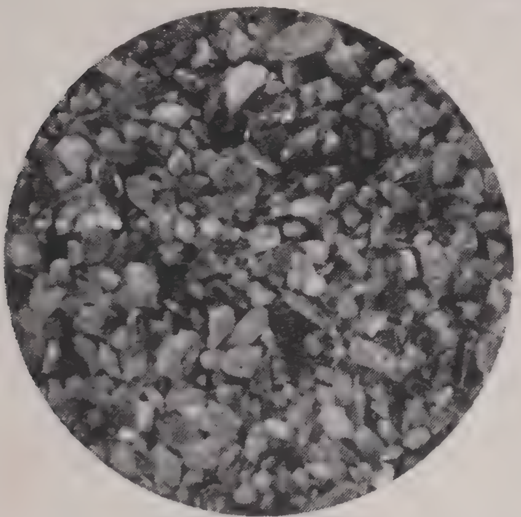
The efficiency with which Sutton equipment was used here to recover clean mica from material composed of mica and gangue also emphasizes the engineering and economical feasibility of applying the S S & S Process for the *separation of virtually any type of dry granular particles from a component of varying bulk density.*

Check into your *own* plant operations with imagination. Sutton equipment is doing a big job for virtually every type of industry. It could be your answer, too.

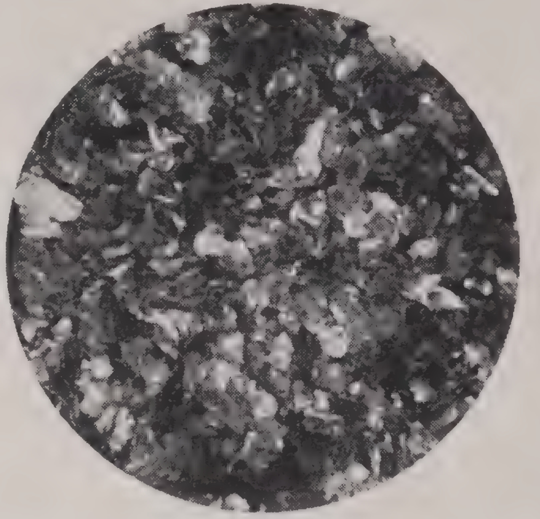
*Unretouched photographs taken during pre-delivery tests.



"CRUDE AS RECEIVED" *was composed of mica and gangue. Bulk of the material ranged from ¾" down to + 20 mesh.*



PRODUCT NO. 1, *consisting of gangue particles, was separated out at the "heavy" end of the Specific Gravity Separator deck.*



PRODUCT NO. 4 *consisted of clean particles of mica, and was removed at the "lighter" end of the Separator deck.*

LITERATURE AVAILABLE

*Tell us about your separating problem. Let us check it against our testing laboratory records which cover hundreds of successful separations. In the meantime, we will forward literature giving a general description of the SS&S Process. Address information to:*

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SUTTON, STEELE & STEELE, INC.
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aged fresh meats were self-serviced. Here, too, common interest in packaging problems is more apparent and should encourage close collaboration between packer and distributor in order that the most advantageous applications can be made.

The packer can furnish his technological knowledge and his experience accrued from large-scale operations. And the distributor can contribute what he has learned about retail sizes and weights, mark-ups, and the condition of packages after handling during transportation and by the consumer.

As with fresh meats, the packaging of cured and ready-to-eat products close to the point of sale is definitely advantageous. The retailer can package catch weights to provide different package sizes, thus again catering to the consumer's desire to purchase the quantity needed at the price she can afford. But the packer must standardize the size or weight of his package. In case of products like wieners, where the consumer gages her needs by count rather than by weight, the count-packages have been favored 2 to 1 over the weigh packages—those put up in ½-lb. and 1-lb. units. On the other hand, the advantages reside with the packer for package smoked meats generally sold by the piece. The same can be said for bacon.

However, the consensus is that cellophane wrapping of callies, butts and similar products is unsatisfactory. The package does not hold up well during handling, it cannot be adequately sealed, it does not conform to the shape of the product, and the package is not attractive. In the case of bacon, there is a mounting criticism against using P.T. cellophane. Conversion to a sealed package making use of L.S.A.T. cellophane is regarded favorably. And we hear comments that vacuum packaging is working out very well. It is a good idea, incidentally, to provide a ½-in. by 1-in. spot on the package for pricing.

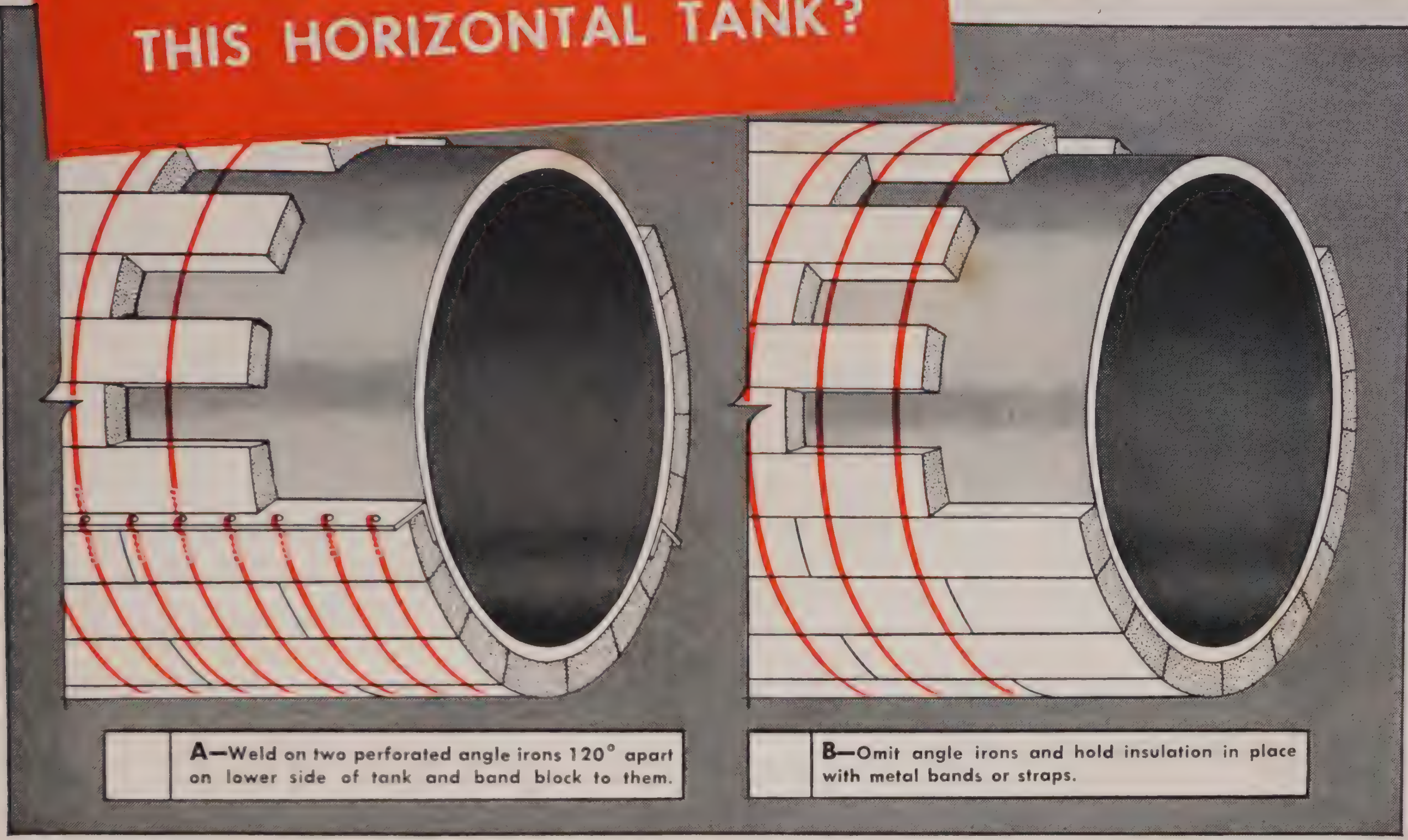
### Discoloring is Tough Problem

Regardless of where prepackaging is done, color fading is the major technical problem. So serious is this problem merchandising-wise, that the prepackager is now turning away from the completely transparent package. He is finding that he must adopt a combination of opaque and transparent materials, guarding the food by keeping the opaque side to the light. This type of wrap is considered a temporary expedient pending a more satisfactory solution.

Urbain and Ramsbottom have pointed out the general nature of the color-fading chemical reaction and the methods of preventing it. Since either light or oxygen must be eliminated

# HOW WOULD YOU ATTACH HEAT INSULATION TO THIS HORIZONTAL TANK?

● **Horizontal tank 6′ in diameter is to be insulated with 2″ thick 85% Magnesia block. Which of the two methods illustrated would you recommend?**



**A**—Weld on two perforated angle irons 120° apart on lower side of tank and band block to them.

**B**—Omit angle irons and hold insulation in place with metal bands or straps.

## HERE'S WHAT THE ARMSTRONG ENGINEER RECOMMENDED:

Both methods shown above will hold the insulation on a 6′ tank firmly in place. But on a tank this size, it is unnecessary to go to the extra expense of welding on and perforating the angle irons. The Armstrong engineer recommended the less expensive Method B.

However, on very large tanks, or where extreme vibration conditions are encountered, it is often necessary to additionally support the bottom third of the insulation. Then Method A, or some other means of providing extra support to the insulation on the underside of the tank, would be in order.

Many times a piece of heated equipment can be efficiently insulated in two or more ways. In these cases, an engineer or workman well grounded in the application of heat insulation can quickly choose the best method.

Armstrong engineers, construction superintendents and foremen are all practical men. If an insulation job presents new or unusual problems, they'll solve them in practical ways. If the choice of several recognized methods is offered, they'll weigh all factors carefully and recommend the most practical one.

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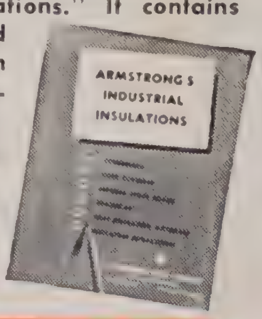

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Fig. 629

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from the package, and since, in the final analysis, light is essential, one is faced with the necessity of removing oxygen. Obviously, the only way to remove oxygen is to vacuum pack or package in an inert atmosphere. The effectiveness of vacuum packaging has been demonstrated by Urbain and Ramsbottom and previously has been mentioned in the case of bacon. From our limited experience with vacuum packaging, we are unable to pass judgment.

Although this method of packaging is being looked upon hopefully, we suspect the need for further development. One difficulty with vacuum packaging is that sliced material will stick together. Another is that the film tends to wrinkle.

In this review, we undoubtedly overlooked many phases of meat packaging. On the other hand, we may have uncovered several phases indicating constructive purposes. Certainly, we hope to emphasize the growing importance of packaged meats.

Our premise has been that interest is centered on merchandising and not the technical problems. This suggests that those charged with scientific research must expose themselves to the "firing line" if we are to ferret out the problems and get the answers. This approach will tend to anticipate the problems that will face the prepackager in the next phase of development.

*The above article is based on paper, "A Review of Prepackaging in Connection With Retailing Meats," recently presented by the author before the research conference which was held at the University of Chicago under the sponsorship of the American Meat Institute Council on Research.*

*—End—*

## Fruit Flavor Recovery

*—Continued from page 49*

adding various quantities of essence at that temperature, and covering with melted paraffin. A control sample for each fruit was made without essence.

These jellies were set aside on a laboratory shelf at room temperatures, and after 3 and 6 months were tested organoleptically by the same panel of 6 men and 6 women (Table IV). An arbitrary value of 7 was assigned to each jelly that scored the lowest in taste and/or aroma tests. Scores of 8, 9 and 10 were given to the other three samples in order of improving quality.

In general, jellies with 0.3 to 0.6-fold added essence were preferred to those without essence or with 0.9-fold added essence. There appears to be a

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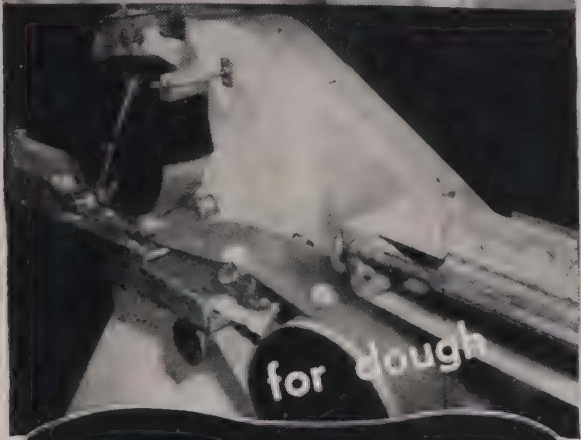
for hot bread



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Cost of One Sheet of Polished 18 Gauge 36"x 120"* when Thickness May Vary Plus or Minus 10%.

.052"— 65.52 Pounds — $31.61
.051"— 64.26 Pounds — $31.01
.050"— 63.00 Pounds — $30.40
.049"— 61.74 Pounds — $29.79 (Theoretical Weight)
.048"— 60.48 Pounds — $29.18
.047"— 59.22 Pounds — $28.57

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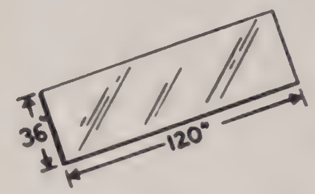

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283

limit as to how much added essence is desirable. If this should work out in practice, it is obvious that all the essence recovered from a juice will not be required for a jelly, leaving some for other use.

Even after 6 months, the essences could be easily detected in the jellies. Although there are some differences between the ratings at 3 and 6 months, these differences are not consistent and are not sufficient for any significant conclusions. The jelly prepared from stripped rhubarb juice and blackberry essence had much of the flavor of blackberry but retained the rhubarb color. A jelly made from 50 percent rhubarb and 50 percent blackberry stripped juice with blackberry essence was only slightly different from one made from blackberry stripped juice and blackberry essence.

### Candy and Jelly Tests

Tests were made at Philadelphia to determine the palatability of the flavors contributed by the essences to pectin gum-type candies and synthetic, 65-percent-sugar jellies prepared without stripped juice. The candies were made from sugar, corn syrup, citric acid, pectin, sodium citrate and coloring matter, and essence added to a 2-fold concentration. The jellies were prepared from sugar, citric acid, pectin, sodium citrate, coloring matter, and essence added to a 1-fold concentration.

These products were submitted to a panel of about 25 people, who scored them on a 1-to-10 scale (10-9, excellent; 8-7, good; 6-5, fair; 4-3, poor; 2-1, objectionable). Table V lists the results in order of preference for the candy. In general, very agreeable flavors characteristic of the fruits from which they were produced were contributed by the essences, and the resulting products were favorably received.

There is a fair degree of agreement between the ratings for the essences in the two products. Youngberry and strawberry flavors were the most popular; only rhubarb jelly and rhubarb, Delaware grape, blackberry, and peach candies rated lower than 6.5. These scorings represent preferences for the individual fruits rather than degree of recovery of volatile aroma from the juices used. It appears likely that more than the optimum quantity of essence may have been used in the jellies produced in Philadelphia. It should be considered, however, that the stripped juices were not used in these jellies. The gum candies normally require a higher proportion of essence than the jellies.

*The authors are indebted to G. Macpherson Phillips, Roderick K. Eskew and J. J. Willaman for general guidance in the project reported above.*

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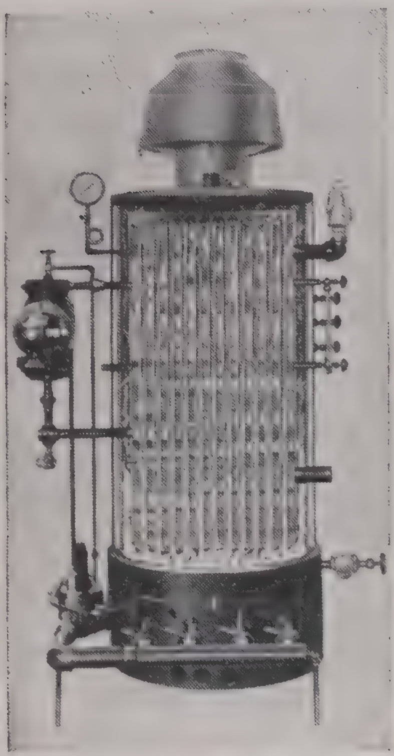

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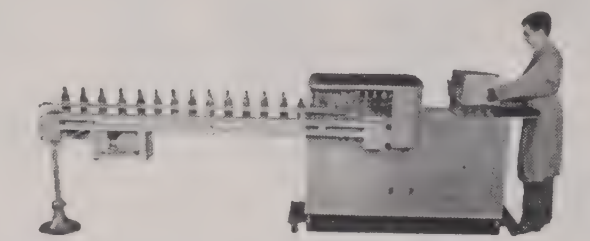

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—Continued from page 46

charts. As a consequence, it is generally applied by technically trained personnel. But savings in expensive technical manpower hours that are realized through these technics can be considerable. Equally important is the more efficient general utilization of these hours.

The selling point of time-and-motion study men after World War I was, justifiably, "the production of better goods at lower costs." And it can be said that this is also the cry of quality control men after World War II. However, in the case of the time-study men, the primary concern was with the problem of men and machines. In the case of SQC, the problem considers materials and machines.

Both, of course, are only tools, not universal panaceas. As such, they must be intelligently applied if those full rewards that await the ambitious and foresighted are to be reaped.

### Suggested Reading

*Federal Dimensional Quality Control Primer,* Federal Products Corp., Providence, R. I. May be had on request without charge.

*Statistical Quality Control,* by E. L. Grant, McGraw-Hill Book Co., Inc., New York City.

*Engineers Manual of Statistical Methods,* by Leslie Simon, John Wiley & Sons, Inc., New York City.

*A. S. T. M. Manual on Presentation of Data,* Supp. A&B, published by American Society for Testing Materials, 1916 Race St., Philadelphia 3.

*Quality Control,* Journal published by American Society for Quality Control, Inc., 305 E. 43rd St., New York City 17.

"Guide for Quality Control and Control Chart Method of Analyzing Data," American War Standards, Z1.1-Z1.2, 1941, American Standards Assn., New York City.

"Control Chart Method of Controlling Quality During Production," American War Standards, Z1.3, 1942, American Standards Assn., New York City.

*Sampling Inspection Tables—Single and Double Sampling,* H. F. Dodge and H. G. Romig, John Wiley & Sons, Inc., New York City.

*Statistical Methods,* by George W. Snedecor, The Iowa State College Press, Ames, Iowa.

### Acknowledgment

*The author is grateful for the cooperation of General Foods Corp. and H. P. Hood & Sons in the preparation of this article.* —End

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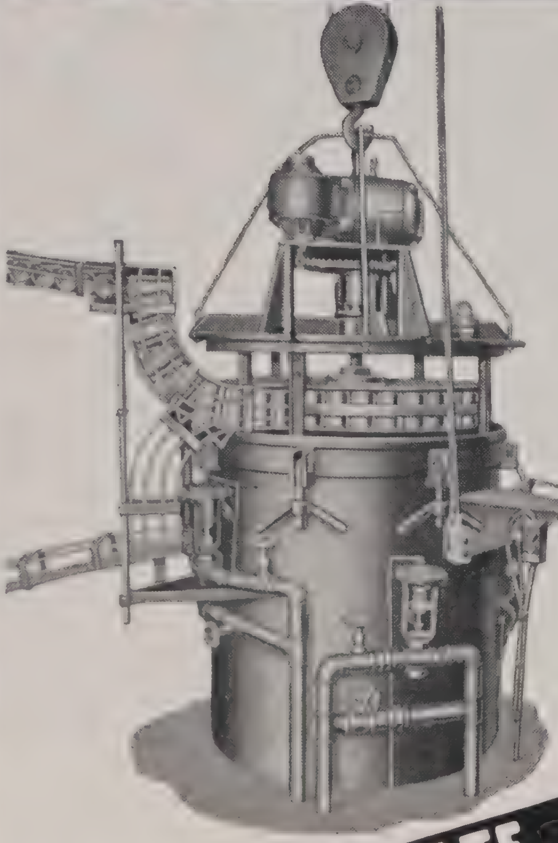

Were you to see this machine in operation you'd be surprised with its operation. There is no machine like it in the canning industry. It's new . . . yet fully developed over the past two years in our laboratory and during the pea and corn packs operated commercially in a local canning plant. It comes to you thoroughly tested and proven. That's why we proudly present it to you now . . . and ask you to check the features emphasized here. We can't begin to tell the whole story here . . . but we'll gladly send you complete details upon request. Write for them today.

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**ELIMINATE 7 TO 11 MEN**

for each closing machine or canning line operation

**NO DAMAGED CANS**

because there's no rough handling of cans by our method

**SAVE COOKING TIME**

We rotate the discs in the retort during cooking cycle

**SAVE COOLING TIME**

Rotation during cooking cycle improves heat transfer

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Space for both loaded and empty cans is not needed, as cans can be suspended from ceiling

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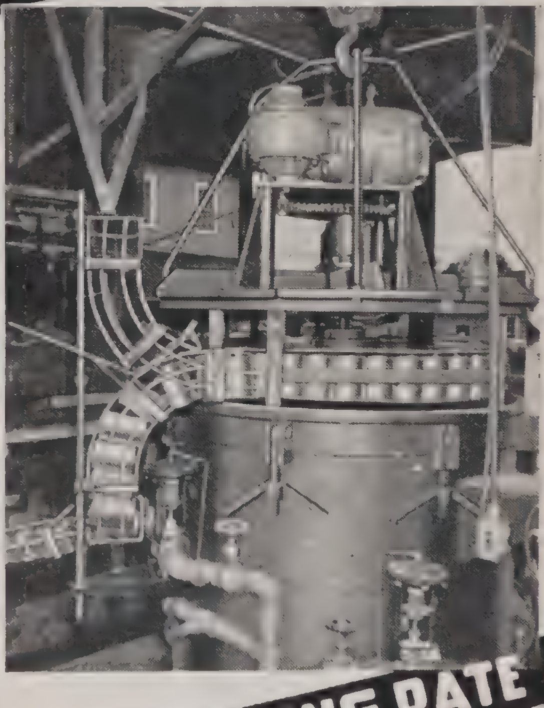

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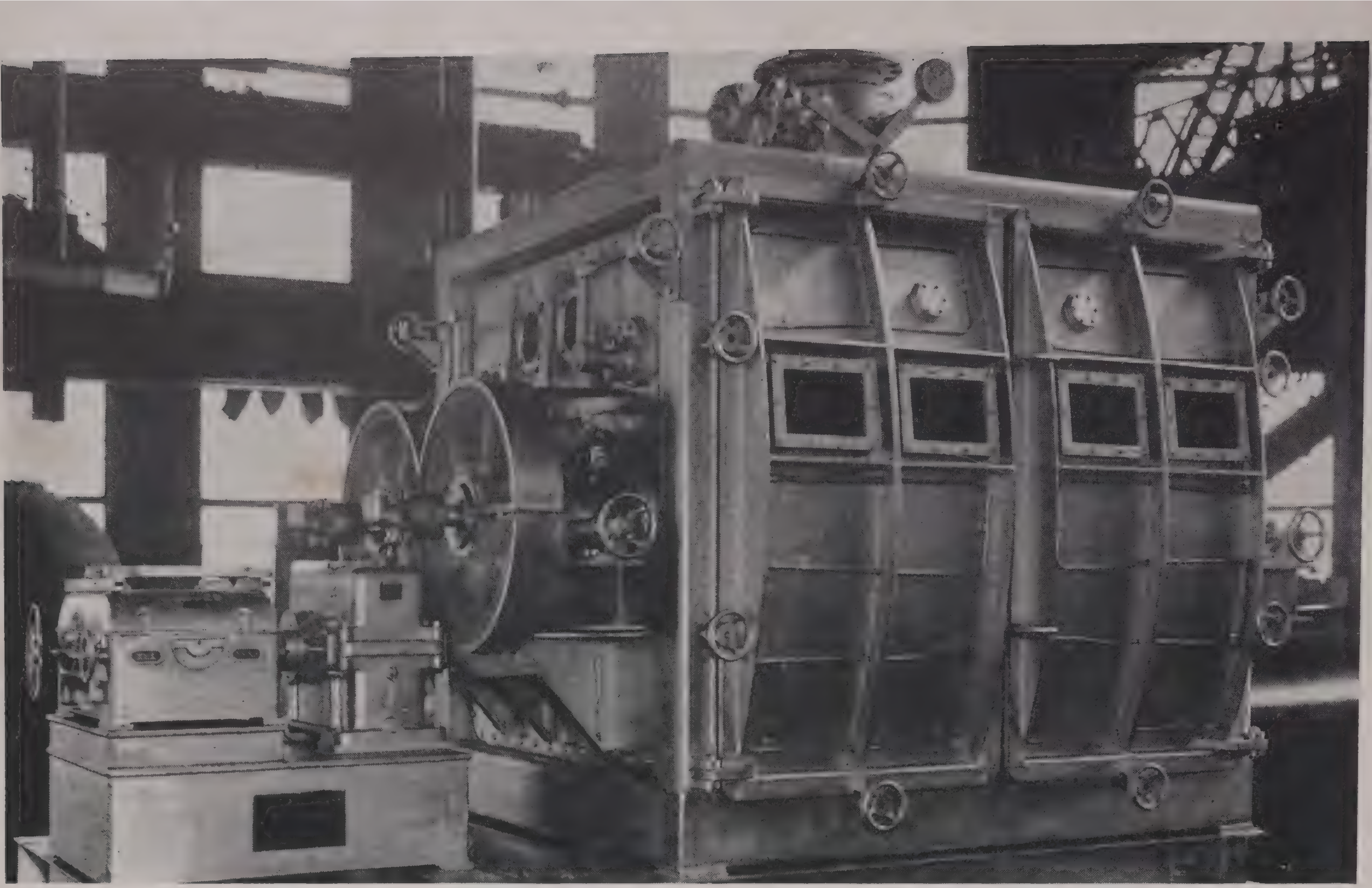

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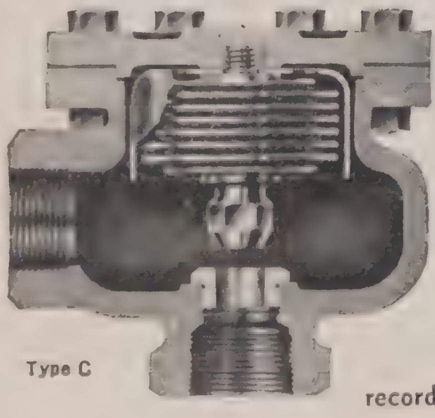

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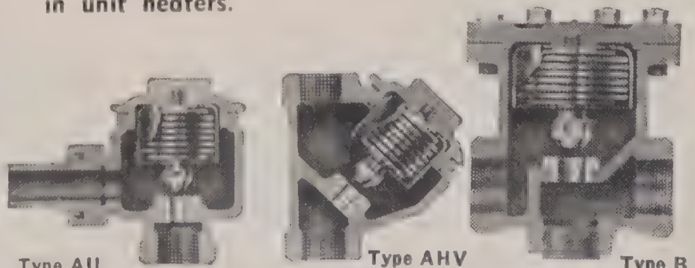

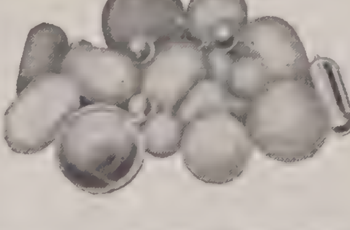

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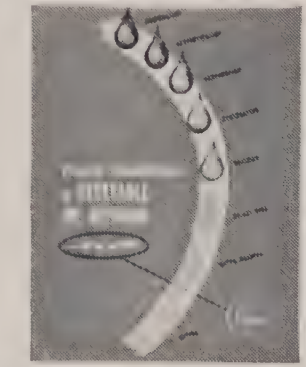

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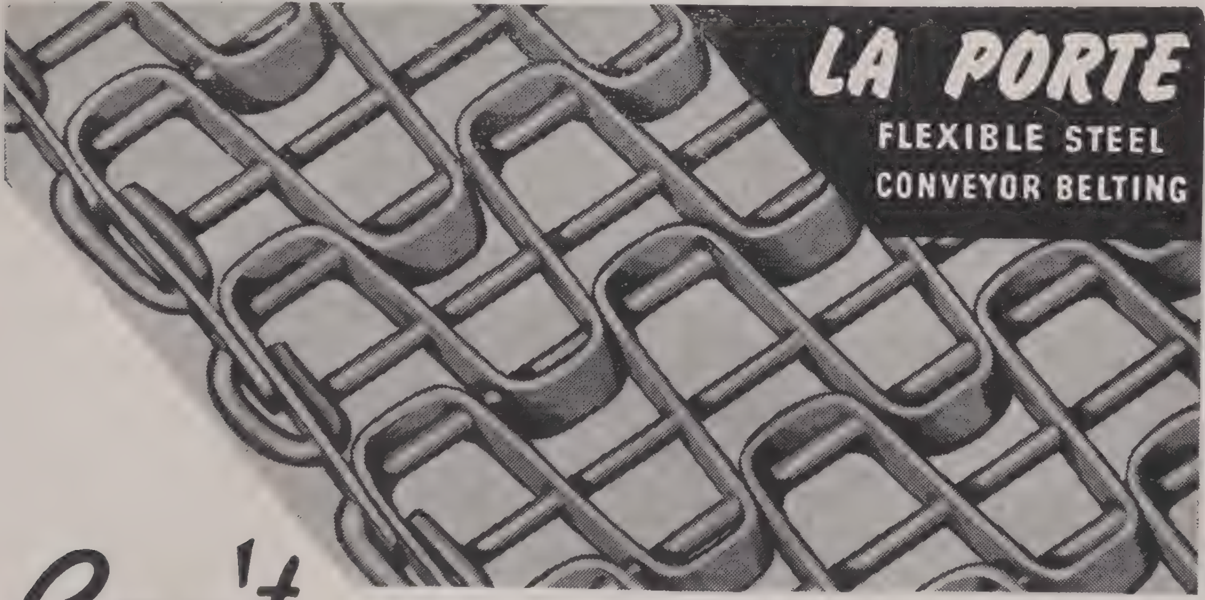

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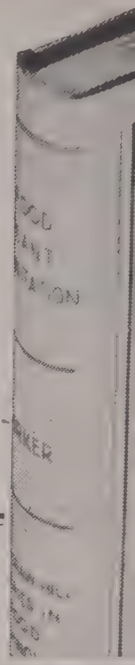

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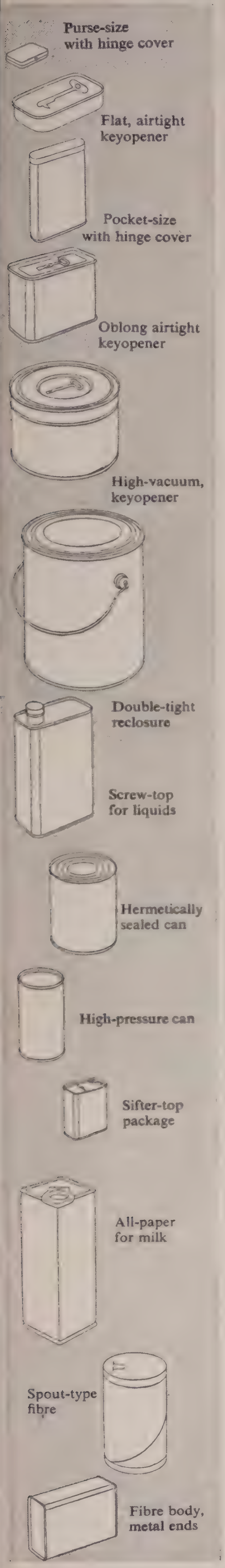
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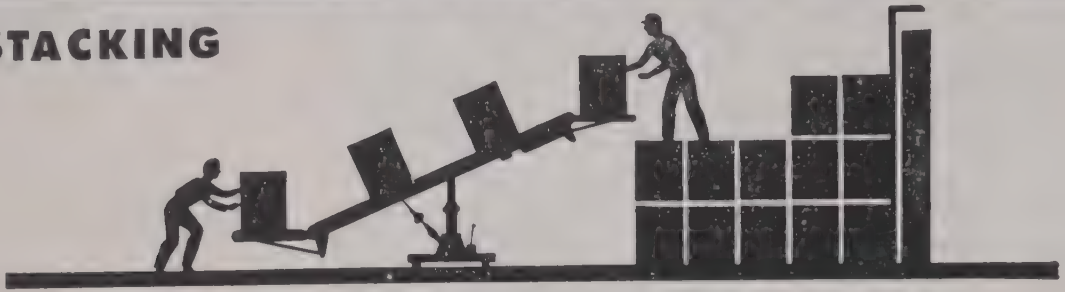

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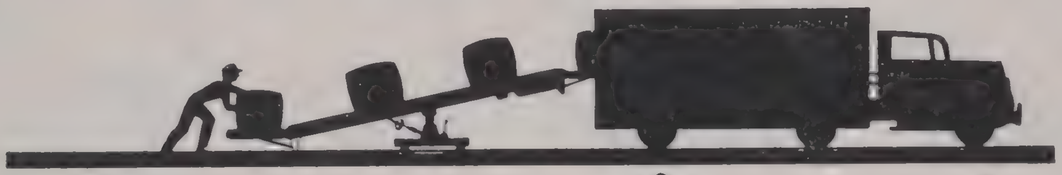

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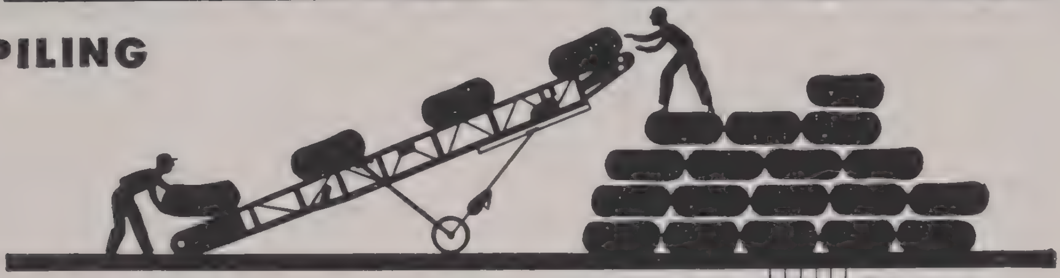

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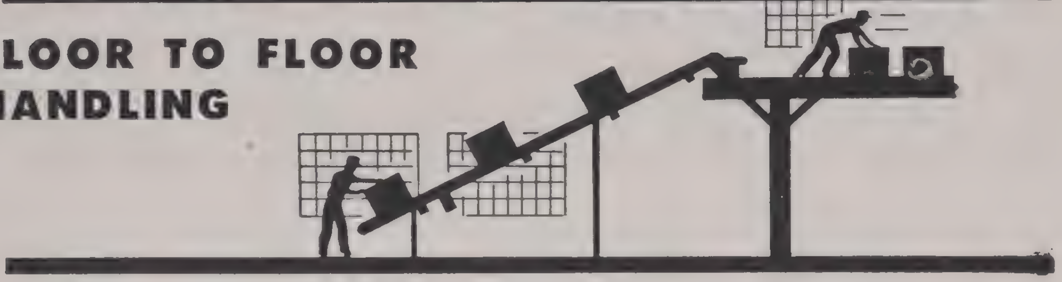

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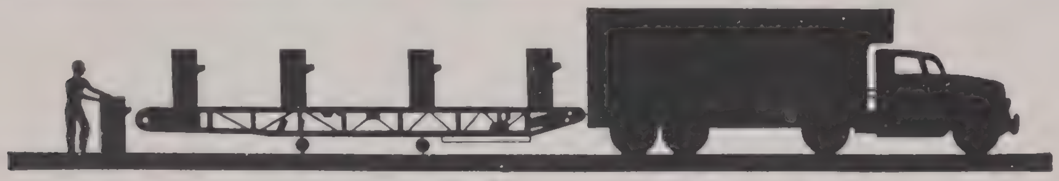

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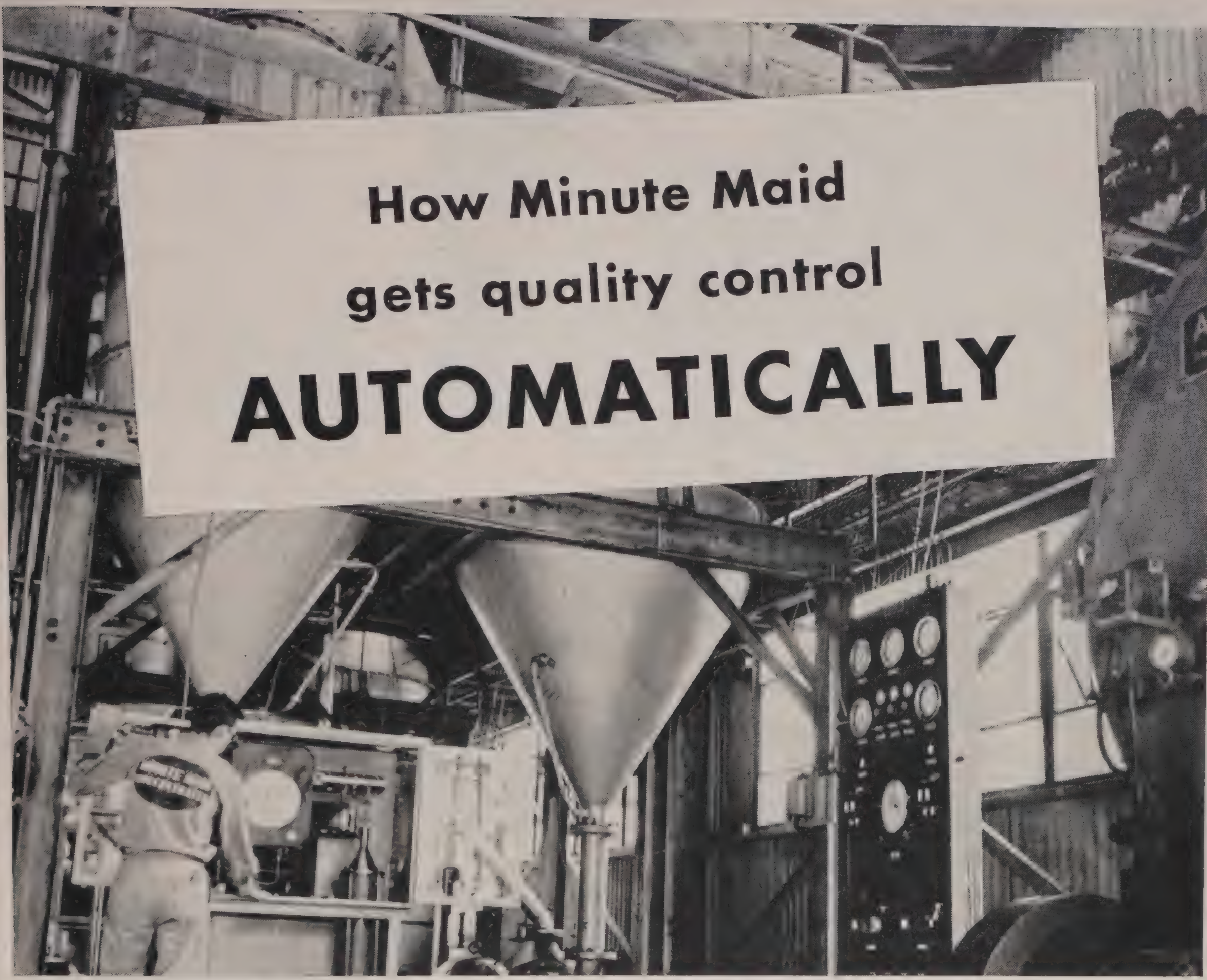

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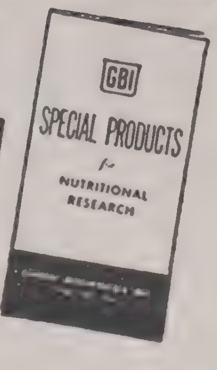

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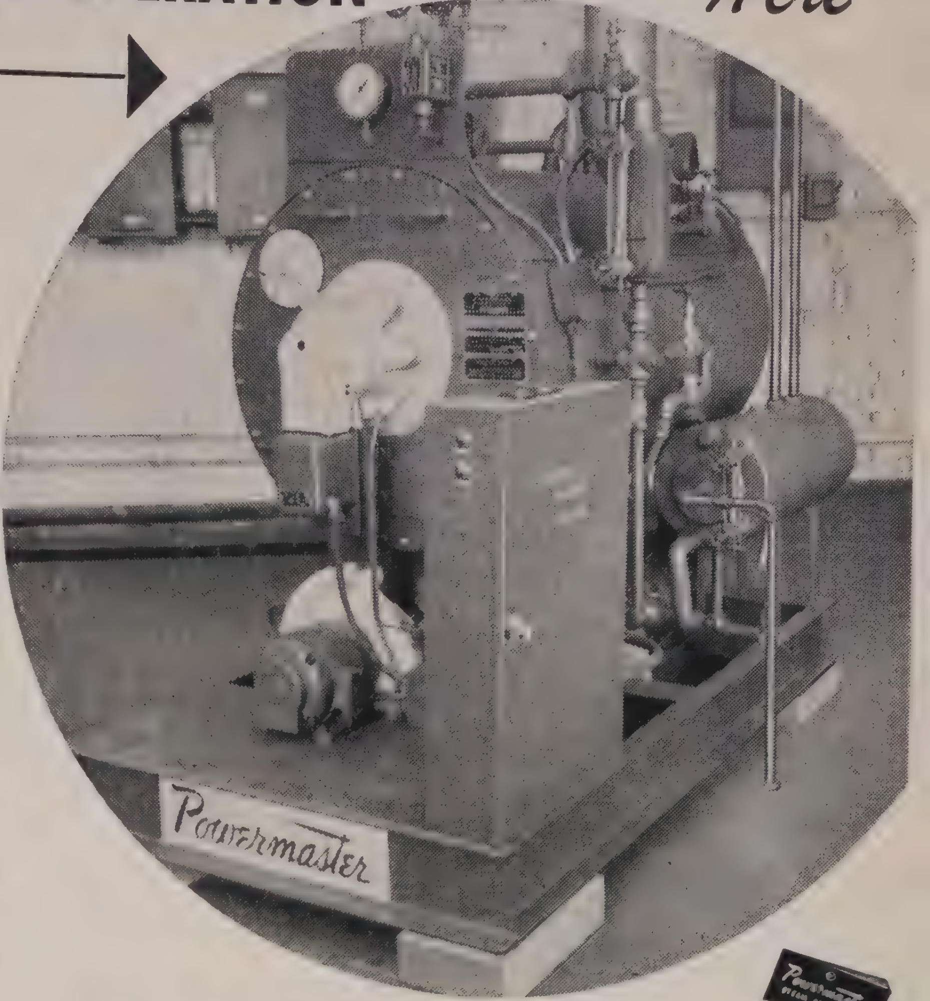

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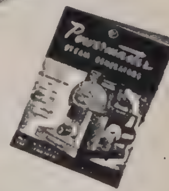

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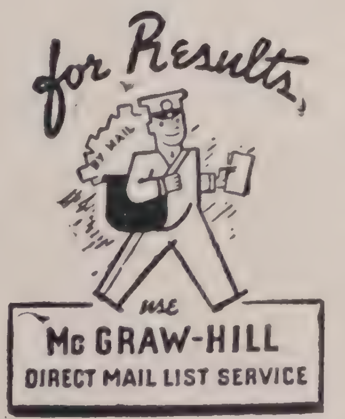

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Designs—Layouts—Investigations—Consultations, —Reports—Market Investigations—Consultations in all phases of Food Preserving by Heat, Drying, Freezing—Consultation in Managing, Warehousing, Distribution—Control and Time Studies.
200 W. 57th St., N. Y. 19, N. Y., CIrcle 6-0785-6

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**Whose Cards Appear on This Page**
with the confidence justified by the offering of these special services nationally.

**MODERN VINEGAR SERVICE**
Large recirculating vinegar making units to fit any requirements. Design, Installation, Operation, Alterations, Consultation.
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Chemical and biological analyses of food materials and products. Food plant design, inspection, process examination and control. More than 75 years of experience serving the food and beverage industries.
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A staff of 75 including chemists, engineers, bacteriologists and medical personnel with 10 stories of laboratories and a pilot plant are available for the solution of your chemical and engineering problems. Write today for Booklet No. 13.
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Specialists in Food Preparation and Preservation; Equipment Testing and Evaluation; Food Freezing; By-Product Utilization; Manufacture of Pure Fruit Flavors.
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Established 1930
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Vitamin Assays
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# SEARCHLIGHT SECTION

## EMPLOYMENT • BUSINESS • OPPORTUNITIES • EQUIPMENT—USED or RESALE

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Not available for equipment advertising
$1.20 a Line—Minimum 4 Lines.
To figure advance payment count 5 average words as a line.
INDIVIDUAL EMPLOYMENT WANTED undisplayed advertising rate is one-half of above rate, payable in advance.
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### INFORMATION:

BOX NUMBERS in care of any of our New York, Chicago or San Francisco offices, count as one additional line.

DISCOUNT OF 10% if full payment is made in advance of four consecutive insertions of undisplayed ads (not including proposals).

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The advertising rate is $9.50 per inch for all advertising appearing on other than a contract basis. Contract rates quoted on request.

AN ADVERTISING INCH is measured ⅞ inch vertically on one column, 3 columns—30 inches—to a page.
F.I.

*NEW ADVERTISEMENTS received by 10 A. M. November 16th will appear in the December issue subject to limitations of space available*

*REPLIES (Box No.): Address to office nearest you*
*NEW YORK: 330 W. 42nd St. (18)*
*CHICAGO: 520 N. Michigan Ave. (11)*
*SAN FRANCISCO: 68 Post St. (4)*

### POSITION VACANT

BACTERIOLOGIST—With training and some experience in industrial microbiology to assist in planning and execution of research and field projects in the canning industry. Aptitude in analyzing and reporting experimental data essential. Eastern location. Salary open. Write P-1258, Food Industries.

**WANTED—INDUSTRIAL ENGINEER**
Excellent opportunity in Industrial Engineering Department of nationally known Food Company, near Syracuse, N. Y. Engineering Graduate, preferably I. E. Age 25 to 35 with three to five years practical experience in Time Study and Wage Incentives. Process or Chemical Industry experience desirable. Submit complete resume to
P-1095, Food Industries
330 W. 42nd Street, New York 18, N. Y.

### EMPLOYMENT SERVICE

SALARIED PERSONNEL $3,000-$25,000. This confidential service, established 1927, is geared to needs of high grade men who seek a change of connection under conditions assuring, if employed, full protection to present position. Send name and address only for details. Personal consultation invited. Jira Thayer Jennings, Dept. F, 241 Orange St., New Haven, Conn.

Well established and financially sound firm of food importers with sales organization in all large cities
**of Switzerland**
with own cold-storage buildings and low-temperature refrigerating plant, seeks connection with food exporters for the sale or distribution of their products in Switzerland.
Write to
Box Z. L. 1929, Mosse-Annoncen A.G.
Zurich 23, Switzerland

Additional Employment Advertising on the opposite page

## CHEMISTS

**Juniors and Senior deg. men**

RESEARCH CHEMIST, Ph.D. milling.....$9,000
CHEMIST-Ph.D. candy research...........$6,000
JR. DAIRY TECHNOLOGIST-ice cream exp. $4,200

"For the beter positions with the better firms"

***Call, write or wire:*** **GLADYS HUNTING**

**DRAKE PERSONNEL**

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## Engineers - Executives - Technical Men

**Salaried Positions, $4,000 to $30,000. This Confidential service for men who desire a new connection, will develop and conduct preliminary negotiations without risk to present position. Send name and address for details.**

**TOMSETT ASSOCIATES**

**1203-2 Berger Bldg.,** **Pittsburgh 19, Pa.**

(Continued from opposite page)

### *POSITIONS WANTED*

---

FOOD CHEMIST, capable analyst and supervisor with production experience desires position as control chemist, PW-9905, Food Industries.

WORKING FOREMAN. Many years experience production quality control, preserves, jellies, allied lines, tomato products, condiments, specialties. Knowledge cooking open kettle vacuum pan. Other equipment. PW-1236, Food Industries.

EXECUTIVE—38 years age—with 15 years experience in Purchasing, Production and Inventory Control, Accounting, Marketing Research, Sales Promotion wishes to become associated with a progressive organization Best of references as to character and ability. PW-1146, Food Industries.

FOOD TECHNOLOGIST, chemist, bacteriologist, age 44. M. S., Ten years experience, production control, quality control product improvement and new product development. Knows, customer service, flavors, equipment layouts, selection of ingredients, costs and over all picture. Food and Drug Law and A.O.A.C. sanitation, safety and pest control. Seeks Challenging opportunity. Technical Director. Production Supt. Technical sales and promotion. Location immaterial, will travel. PW-1155, Food Industries.

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### *POSITION WANTED*

FOOD AND Flavor Chemist "Top-Notch" Man; broad experience in research and production; intimate knowledge of basic food and flavor ingredients; scientific technical background; loyal, reliable, runs production; desires employment in or near N. Y. City. PW-1261, Food Industries.

PLANT MANAGER Graduate Engineer, age 37 experienced in general food packing operations, presently employed, desires change. Has outstanding record of Const Reduction through improved methods. Has particular specialized experience in materials handling. PW-1276, Food Industries

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**Large engineering firm wishes to acquire several complete food plants through purchase of (1) capital stock, (2) assets, (3) machinery and equipment, whole or in part. Personnel retained where possible; strictest confidence.**

***Box 1219, 1474 Broadway, N. Y. 18, N. Y.***

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to your business problems
use
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Engineering News-Record
E. & M. J. Markets
Factory Management and Maintenance
Food Industries
Neuclonics
Operating Engineer
Power
Product-Engineering
Textile World
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*For advertising rates or other information address*
Classified Advertising Division
McGRAW-HILL PUBLISHING CO., INC.
New York 18, N. Y.

## COURSES IN FOOD TECHNOLOGY

a. Mathematics and Chemistry of Food Technology
b. Food Analysis
c. Nutrition
d. Canning
e. Freezing
f. Preserving
g. Inspection and Grading according to USDA standards
h. Mold Counting and Insect Examination

RESTAURANT MANAGEMENT
GENERAL STUDY OF COOKING
PREPARATION OF SALADS
PIE AND PASTRY MAKING
CAKE DECORATING
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MEN OR WOMEN
VETERANS OR NON-VETERANS
DAY AND NIGHT CLASSES

*Highly qualified instructors with practical experience as well as European and American degrees in their respective fields.*

**MIAMI SCHOOL FOR FOOD PROCESSING SPECIALISTS**

**Box 383** **CORAL GABLES 34, FLORIDA**

## PLANT AVAILABLE

**Plant equipped with 8 large mixing vats, large dehydrating tunnel, pumps, misc. equipment ready for operation, suitable for processing, bottling, packaging Chemical or Food. Area 6500 ft. Three year lease Bridgeport, Conn. For Sale or Lease on your terms**

BO-1166, Food Industries
330 W. 42nd Street, New York 18, N. Y.

FOR SALE

## COMPLETE LABORATORY

including brand new tables, sinks, and research equipment.

BO-1254, Food Industries
330 West 42nd St., New York 18, N. Y.

## COMPLETE COCONUT PLANT

**FOR SALE**

**Formerly Sunland Products Corp. 30,000 lbs. output per 24 hr. run. Includes P & S dehydrator, 150 H.P. boiler, packaging equipment, etc. Will accept reasonable offer.**

**LISS EQUIPMENT,**

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1. The name and address of the publisher, editor, managing editor, and sales manager is: Publisher McGraw-Hill Publishing Company, Inc. 330 West 42nd St., New York 18, N. Y.; Editor F. K. Lawler 330 West 42nd St., New York 18, N. Y.; Managing editor H. Powell 330 West 42nd St., New York 18, N. Y.; Sales manager L. E. Crist 330 West 42nd St., New York 18, N. Y.

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McGRAW-HILL PUBLISHING COMPANY, INC.
By J. A. GERARDI, Secretary

Sworn to and subscribed before me this 20th day of September, 1949.

[SEAL] ELVA G. MASLIN
(My commission expires March 30, 1950)

## LOWER PRICES NOW on GOOD USED FOOD EQUIPMENT

**Vacuum Cookers, Retorts**
**Kettles, Reactors,**
**Dryers, Evaporators**
**Canning & Packaging**
**Equipment such as**
**Fillers, Labelers,**
**Cappers, Washers, Cutters**
**Slicers, Choppers, etc.**
**Complete Plants for**
**Vegetables, Fruits,**
**Juices, Jams, Preserves**

●

**For quick quotations on desirable machines send us your inquiry.**

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***You can BANK on the***

**EQUIPMENT CLEARING HOUSE, INC.**

**289-10th ST., BKLYN 15, N. Y.**

## FOR SALE AT REDUCED PRICE EVAPORATOR—IN NEW CONDITION

**Double effect Mojonnier Tubular Evaporator. Continuous operation for producing Condensed Milk—Ice Cream Mix. Never used in manufacturing. Also suitable for condensing other liquids.**

*Write* **HERSHEY CREAMERY CO.**

**Box 121** **Harrisburg, Pennsylvania**

## WHERE TO STORE FROZEN FOODS

**QUAKER CITY COLD STORAGE CO.**

**PHILADELPHIA, PA**
**3 WAREHOUSES**

***Proper Temperature for Frozen Foods***

## WANTED

*Buyers of*

**SOLDER RESIDUES**
**TIN RESIDUES, etc.**

from canning plants

N. V. GROMA, INC.
50 Broad Street, New York 4, N. Y.
*Tel. BOwling Green 9-0420*

FMC

## The Sign of Good Equipment "Buys"

If you're coming to New York for the Chem-Show, remember equipment headquarters is at First Machinery Corp., 157 Hudson St., only minutes away from the Exposition AND we've Got *MORE* equipment too.

### FOOD AND CANNING EQUIPMENT FOR IMMEDIATE DELIVERY. COOKERS—EVAPORATORS—VACUUM PANS

40—Steam Jackets Kettles in Stainless, Aluminum or Copper (some with agitators) up to 500 gallons.
25—Vacuum Cookers, jacketed or coiled in copper, stainless and steel—50 to 1000 gallons.
4—Pfaudler Glass Lined Vacuum Cookers, coiled or jacketed, with agitators, 500 gallons to 2500 gallons.

### RETORTS AND STERILIZERS

35—Standard F.M.C. or Robins 40" x 72" Retorts with crates and instruments, complete, vertical or horizontal; larger horizontal Retorts up to 18 ft. long.

### DRYERS AND DEHYDRATORS

2—Stainless Steel Atmospheric Drum Dryers, 5′ x 10′—Other single and double drum Dryers in cast iron up to 4′ x 9′.
6—Steam Tube Dryers by Louisville, Davenport and others, up to 50′ long.
3—Rotary Vacuum Dryers, 3′ x 20′, 5′ x 10′ and 5′ x 33′.
4—Proctor & Schwartz Conveyor and apron Type Dryers, up to 72′ long.

### PASTEURIZERS—HEAT EXCHANGERS

2—Chisholm Ryder Stainless Tubular Heat Exchangers, 10′ long—Model SI.
2—CRCO American Vac Type Pre-Heaters in stainless, 15′ long. Model V.
3—Cherry-Burrel Pasteurizers, nickel tubes, 6′ long, 8 high.
6—Sets of Kook-More Coils in copper or stainless.

### PULPERS—FINISHERS—JUICE EXTRACTORS

6—Stainless juice Extractors, Model B—CRCO; 4 in nickel.
4—Indiana Pulpers, bronze, No. 112-119.
5—Food Machinery Co. Pulpers, Models #50-100.
6—Langsenkamp Brush Type Finishers.
5—CRCO Tomato Choppers and PreHeaters.

### COLLOID MILLS—HOMOGENIZERS—VISCOLIZERS

1—Cherry Burrell Sanitary Stainless Viscolizer, 800 GPH.
2—Union Stainless Steel Viscolizers with 20 HP motors, 800 GPH.
8—Marco Flow Master, Homogenizers, all sizes.
24—Eppenbach, Charlotte, Premier, U. S. Gaulin and other standard make Homogenizers from Lab. size to 50 HP.

### FILTERS AND FILTER PRESSES

7—Ertel, Alsop, Star Disc Filters, single and multiple in bronze, nickel and other non-corrosive contact parts.
38—Filter Presses by Shriver, Sperry, Johnson in wood, cast iron, bronze, etc.

### FILLING EQUIPMENT

15—Vacuum Fillers, rotary and straight line by Kiefer, Pneumatic Scale, FMC, Horix, etc.
12—FMC, Berlin Chapman, Horix, Haller Juice Fillers.
4—FMC and Chisholm-Ryder Stainless Hank Pack Fillers for No. 2's and 10's.
5—M & S 6 pocket Fillers.
12—Piston Type Fillers from single to 11 pistons by Filler Machine Co., Elgin, and Pfaudler.
25—Dry Powder Fillers by Stokes & Smith, Pneumatic Scale, Triangle, National Packaging and others.

### LABELING EQUIPMENT

20—World, Ermold, New Jersey semi-automatic Labelers.
12—Fully automatic Pneumatic Scale, World, New Jersey and others.
10—Can Labelers by Standard Knapp, Burt, Nu-Way, Chisholm-Ryder and others.
6—Can Casers state size and pack required.

### MISCELLANEOUS

Centrifugal Extractors
Rietz and Fitzpatrick Disintegrators
Hercules Ice and Bone Choppers
Urschel and Sterling Dicers—Cutters
Meat Mixers, Grinders, Choppers
Washers, Peelers, Cutters, Grinders
Equipment for Corn, Peas and Bean, Pumpkin

### PLANTS FOR SALE

Brewery—Distillery—Winery
Vegetable Processing, Packing
Meat and Poultry—Packing
Vegetable Oil Extractor
Macaroni—Spaghetti
Peanut Butter—Salad Dressing
Citrus Fruit Packing

**FIRST MACHINERY CORP.**
**157 Hudson Street,**
**New York 13, N. Y.**

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## OUTSTANDING EQUIPMENT AT THE RIGHT PRICE

1—New Pfaudler Glass Lined Reactor—500 gals.
1—New Glasscote 1000 gal. Jacketed Agitated Glass Lined Reactor.
1—Code Welded Type 316 Stainless Steel Jacketed Reactor 1000 gals. with Agitator & Exp. Pr. Motor.
6—Stainless Steel Tanks. 2000 to 8000 gals.
1—Stainless Steel 9 Stem Rotary Vac. Gal. Filler.
1—Standard Knapp Adj. Can & Bottle Labeler incldg. gals.
6—Stainless Steel Centrifugal Pumps, 1-5 H.P.
1—Sperry 42" Wood Plate & Frame Filter Press, Hyd. Closure 57 ch., 1-3/4" cake.
1—Shriver 12" Lead Plate & Frame Filter Press, 14 chamber, 1" cake, cl. dely.
12—Horiz. Spiral Mixers 50 to 2500 lbs. capacity.
1—Stokes 30" x 8′ Rotary Vacuum Dryer.

New Stainless Steel Jack. Kettles, Tanks
Agitator and Conveyors

We Buy Your Surplus     Send for Latest Bulletins

**The Machinery and Equipment Corp.**
533 West Broadway
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## WELCOME TO THE CHEMICAL SHOW NOVEMBER 28TH TO DECEMBER 3D.

Put a visit to our warehouse on your must list.

Largest display of Fillers, Kettles, Tanks, Filters, Dryers, Labelers, Gluers, Mixers, Screens, Pumps, Conveyors, Packaging Equipment. Get our quotations on your immediate needs.

*Ask for our stock list.*

**BRILL EQUIPMENT COMPANY**
2401 Third Ave.     New York 51, N. Y.
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### FOR SALE

24"x20" Buflovak Vacuum Drum Dryer.
32"x72" and 36"x120" Double Drum Dryers.
100 to 300 gal. S.S. Mix Tanks, water jkt.
200 and 400 gal. S.S. Tanks, insul., agit.
150 gal. Votator (Rapid Heat Exchanger)
40 & 100 gal. S.S. Clad, also Alum. Kettles, jkt.
Ft. Wayne Sterilizer, (agit.) 4′x6′6".
100 to 330 gal. Pfaudler Tanks, water jkt., agit.
2000 and 3000 gal. Pfaudler Tanks, agit.
Hobart Mixer, 3 speed, 2 H.P.
200 to 1000 gal. Homogenizers or Viscolizers.
10" Bronze Filter, 14 plates with Pump.
3′ to 6′ S.S., also Copper Vacuum Pans.
"Lightnin" Portable Mixers, 1/3 & 1/4 H.P.
Model 148C Stokes High Vacuum Pump, 1½ H.P.
600 to 1000 gal. Rect. S.S. Vats, 2 ft. deep.

Send us your inquiries

**LESTER KEHOE MACHINERY CORP.**
1 East 42nd Street, New York 17, N. Y.
Murray Hill 2-4616

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FOR SALE

### Anstice Heavy Duty Dicer

Complete with motor and two dicing attachments—quarter inch and half inch. Recently reconditioned and guaranteed in perfect working order.

**TAYLOR'S TROPICAL SWEETS**
Davenport     Florida

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## EQUIPMENT FOR FOOD AND PROCESS INDUSTRIES

1—#5 Mikro Atomizer, Stainless Steel, w/20 HP Motor.
1—#2TH Mikro Pulverizer, w/15 HP Motor.
1—Sperry Stainless Steel Filter Press, 24" x 24", 12 chambers.
1—Sperry Stainless Steel Filter Press, 12" x 12", 15 chambers.
1—Patterson nickel lined Blender, 192 cu. ft. cap. w/20 HP Motor.
2—Pfaudler 50 gallon glass lined jacketed stills, complete.
1—Pfaudler 5 gallon glass lined jacketed still, complete.
1—J. P. Devine 5 shelf Vacuum Shelf Dryer.

**R. GELB & SONS, INC.**
**UNION, N. J.**
Est. 1886     UNionville 2-4900

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### FOR SALE

100 qt. Read Vertical Mixer
80 qt. Hobart and Triumph Mixers
Enterprise Grinder with 8⅝" plates
Burns Peanut Roasters, Cooling Truck, Blowers and Blanchers
Buffalo Chicle Chopper

**SAVAGE BROS. CO.**
2638 Gladys Ave.,     Chicago 12, Ill.

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### FOR SALE

**Filler:** Peumatic 18 spout, stain. steel.
**Meat Mixers:** Boss #3 and #15.
**Dryers:** 2- 6x40′ Davenport hot air rotary.
**Mixers:** 80 qt. 3 and 4-speed Hobart Vertical.
**Mixer:** 120 qt. Glen Power Plus, var. speed.
**Mixers:** Powder; 20-20 Burton, 1000# Robinson.
**Kettles:** Stain. Steel, all sizes, (New).
**Fillers:** for liquid, powder, paste.
**Fillers:** Stokes & Smith single and double.
**Filter Presses:** 7", 12", 24", cast iron.
**Pumps:** Stain. Steel Centrifugal, 2 hp.
**Hammer Mill:** Prater with 7½ hp. motor.
**Vacuum Pan:** 6′ copper, coils and jacket.
**Labelers:** for bottles, jars, cans.
**Filler:** M&S, Universal 6-pocket.
**Carton Gluer:** Ferguson with comp. unit.
**Centrifugal:** Tolhurst 40" suspended steel.

Send us a list of your idle equipment

**LOEB EQUIPMENT SUPPLY CO.**
1931 W. North Ave.     Chicago 22, Ill.

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## 2—Flow Master Homogenizers

200 and 300 Gallon GPH 7½ H. P.
3 Phase—Both in first class condition.

*Will sacrifice for quick sale.*

**Oklahoma Dairy Supply Company, Inc.**
901 West Reno     Okla. City, Okla.

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### FOR SALE

| | |
|---|---|
| Ertel Vacuum Type, straight line bottle filler, 8 stem, stainless steel, semi-automatic | $675.00 |
| Illco Water Demineralizer, 2 cylinder Ion Exchange Type | $445.00 |
| 4 plate, bronze Sparkler Filter | $75.00 |
| Experimental laboratory still, electric heating units, packed column, copper | $125.00 |
| Seko Analytical Balance with magnetic damper and complete set of weights | $95.00 |
| Fairbanks barrel scale, capacity 625 lbs. | $75.00 |

**VALLEY INDUSTRIES, INC.**
8225 Vine St.     Cincinnati, 15, Ohio

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FOR EVERY
BUSINESS WANT
*"Think Searchlight First"*

# Late Type Processing Equipment

UNION Rebuilt Machinery Established 1912

## NOW AVAILABLE AT BARGAIN PRICES

Stokes & Smith G4 and Auto. Duplex Auger Powder Fillers, cap-pressing attachments.

National Packaging JK Two Station Automatic Auger Powder Filler, with cap-pressing attachment.

Burt Automatic Wraparound Labeler.

Colton and F. J. Stokes Late Style Rotary and Model T Tablet Machines.

Triangle Package Models U1 Auger, G2C and A60A Electri-Pak Fillers.

Triangle SHA Auto. Net Weigher with High Speed Adj. Semi-Auto. Carton Sealer.

Standard Knapp No. 429 Carton Sealer, 10 and 18 ft. Compression Units.

Package Machinery Co. FA2Q Wrapper: Hayssen 3-7 and Knapp JS Automatic Cellophane Wrappers.

Mikro 4TH, 2TH & 1-SH, Jay Bee 3AT and U1, Schutz-O'Neill, Stedman Mills.

Baker Perkins and Readco Heavy Duty 100-150 gal. Double Arm Jacketed Mixers with Sigma or Fish-tail Blades.

J. H. Day 8-gallon Pony Mixer.

F. J. Stokes, J. H. Day, New Era, Hottman Mixers, from 2 gallons up to 450 gallons, with and without Jackets, Single and Double Arm Agitators.

Day and Robinson 100, 600, 1000, 2400, 4000 lbs. Dry Powder Mixers and Sifters.

Schutz-O'Neil #3 Sifters; Gayco 8' Air Separator.

Pony M & MX Duplex Labelrites, Ermold and World Semi & Fully Automatic Rotary & Straightaway Labelers.

Horix, MRM Stainless Steel Rotary Fillers, Elgin 24 Head Rotary Filler, Bagby Twin Piston Filler, Bottom Feed.

Ertel 12 Head S.A. Vacuum Filler.

Sweetland, Vallez, Sperry, Shriver, Johnson and Republic Filter Presses.

Pneumatic Scale Auto. Tite-Wrapper.

Ceco Auto. Carton Closing Machine.

Filler 1, 4 and 8-head Stainless Steel Automatic Piston Fillers, Rising Bed feature and automatic Feed.

Huhn, Steam & Gas-fired Rotary Dryers.

A. O. Smith and Hersey 6' x 23' Rotary Vacuum-Dryer.

Doughboy No. 40 and Amsco Rotary Bag Heat Sealers.

Enterprise, late model, 6K, 6-inch motor driven Fruit and Meat Grinder.

ALL EQUIPMENT GUARANTEED TO BE IN GOOD WORKING CONDITION.

Write, Phone, Wire Collect for Details and Prices on your Requirements.

**Union STANDARD EQUIPMENT CO.**
318-322 LAFAYETTE ST., NEW YORK 12, N.Y.

TOP PRICES PAID
FOR YOUR
SURPLUS EQUIPMENT

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## "CONSOLIDATED" OFFERS

3—7500 gal. Steel Kettles, with copper coils, closed Agitated, 10' dia. x 12'6" deep, 15' overall height.
20—250 gal. Copper, jacketed Kettles, open top, with stands, 50" dia. x 42" deep.
1—2000 gal. Steel, Jacketed Kettle, open top, Agitated, 7" dia. x 7'6" deep.
1—Anco 3' x 6' Chilling Roll, M. D.
1—Louisville Steam Tube Dryer, 6' x 50'.
1—Rotary Vacuum Dryer, 5' x 33".
1—#12 Sweetland Filter, 4" centers, iron or copper leaves.
3—Pkge. Machinery Type F9 Cellophane or Wax Wrapping Machines.
8—Day Powder Mixers, up to 2,000#.
2—Stokes & Smith Powder Fillers, M. D.
2—World Rotary Automatic Labelers.
1—York 6" x 6" Refrig. Unit, 20 HP Motor.
1—Buffalo 32 x 90" Atmos. Double Drum Dryer, 20 HP AC Motor, s/s hood.

ONLY A PARTIAL LIST

THE KEY TO SAVING TIME AND MONEY
CONSOLIDATED
PRODUCTS COMPANY, INC.
13-17 Park Row New York 7, N. Y.

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## WE CAN FURNISH AT ANY POINT NEW AND USED TIGHT AND SLACK BARRELS AND STEEL DRUMS, PAILS AND KITS. LET US HAVE YOUR INQUIRIES.

BUCKEYE COOPERAGE CO.
3810 Orange Ave., EXpress 3383, Cleveland 15, O

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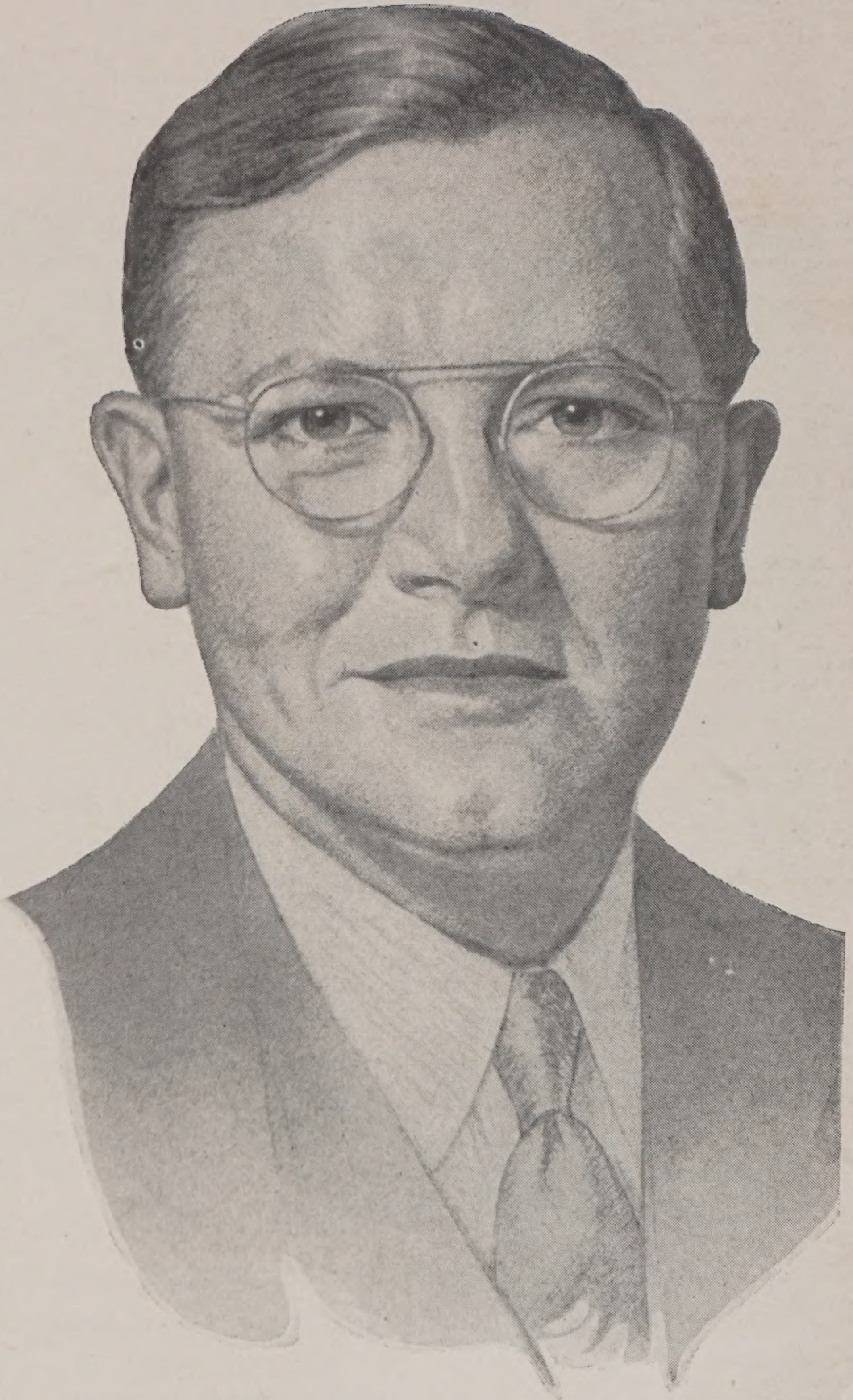

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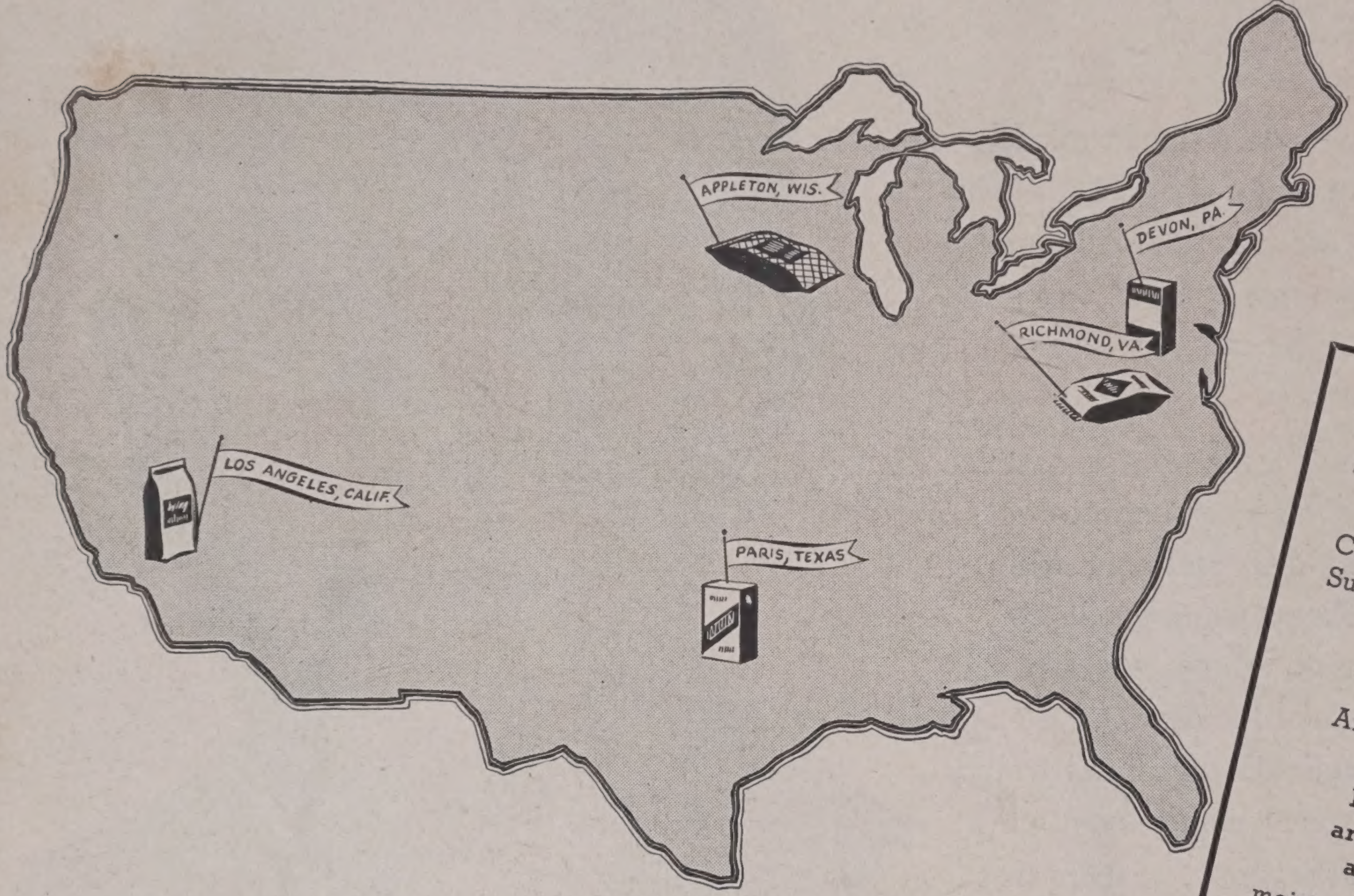

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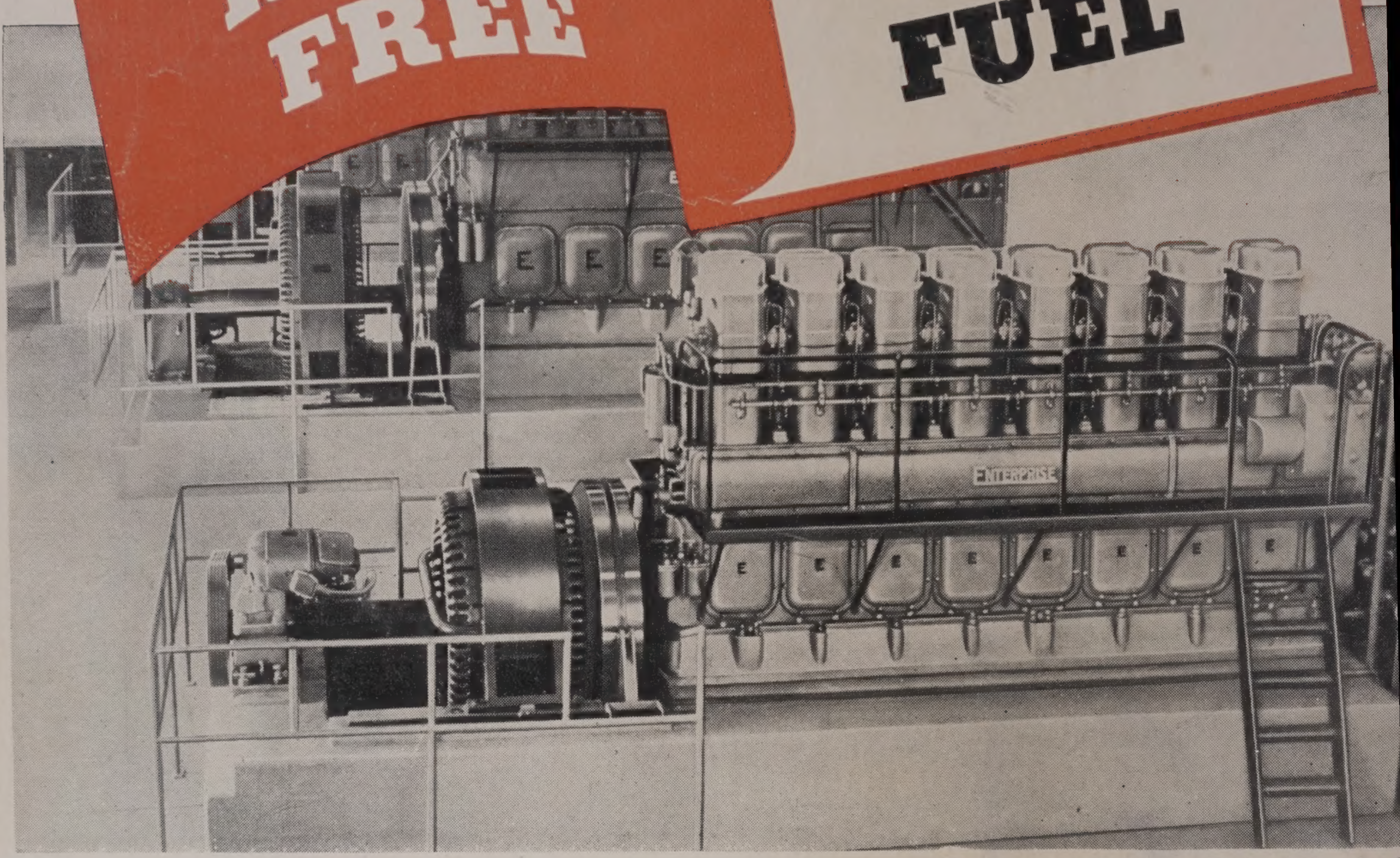

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